Metals Review

THE NEWS DIGEST MAGAZINE

Published by the American Society for Metals

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Volume XXII, No. 9 METAL SHOW ISSUE September, 1949

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NEW HAVEN 8, Conn. THE A. F. HOLDEN COMPANY 1627 W. Fort Street, Detroit 16, Mich.

Announcing the

FOURTH

Metallographic Exhibit

to be held at the National Metal Congress and Exposition in Cleveland, Oct. 17 to 21, 1949. Rules are simple and few; there are no restrictions as to size or method of mounting. A large area in the exhibition hall has been reserved so the entries can be displayed to best advantage.

RULES FOR ENTRANTS

Work which has appeared in previous Metallographic Exhibits is unacceptable.

Photographic prints shall be mounted on stiff cardboard, each on a separate mount. Each shall carry a label giving:

Name of metallographer
Classification of entry
Material, etchant, magnification
Any special information as desired

Transparencies or other items to be viewed by transmitted light must be mounted on light-tight boxes wired for plugging into an ordinary lighting circuit, and built so they can be fixed to the wall.

Exhibits must be delivered between Oct. 1 and Oct. 12, 1949, preferably by prepaid express or registered parcel post.

Address: Metallographic Exhibit,
c/o W. H. Eisenman
National Metal Congress and Exposition
Cleveland Public Auditorium, Cleveland, Ohio

CLASSIFICATION OF MICROGRAPHS

1. Cast Irons and Cast Steels
2. Toolsteels (except carbides)
3. Irons and Alloy Steels (excluding stainless) in Wrought Condition
4. Stainless and Heat Resisting Steels and Alloys
5. Light Metals and Alloys
6. Heavy Nonferrous Metals and Alloys
7. Powder Metals (and carbides) and Compacts
8. Weld Structures (including brazed and similar joints)
9. Series of Micros Showing Transitions or Changes During Processing
10. Surface Phenomena and Macrographs of Metallurgical Objects or Operations (2 to 10 diam.)
11. Results by Non-Optical or other Unconventional Techniques.

AWARDS AND OTHER INFORMATION

A committee of judges will be appointed by the Metal Congress management which will award a first prize (a blue ribbon) to the best in each classification. Honorable Mentions will also be awarded other photographs which in the opinion of the judges closely approach the winner in excellence.

A Grand Prize, in the form of an engrossed certificate, and a money award of $100 will be awarded the exhibitor whose work is adjudged "best in the show", and his exhibit shall become the property of the American Society for Metals for preservation and display in the Sauveur Room at the Society's Headquarters. All other exhibits will be returned to owners by prepaid express or registered parcel post during the week of Oct. 23, 1949.

Entrants living outside the U. S. A. will do well to send micros by first-class letter mail endorsed "May be opened for Customs inspection before delivery to addressee".

31st NATIONAL METAL CONGRESS

CLEVELAND PUBLIC AUDITORIUM, CLEVELAND

October 17 to 21, 1949

Metals Review

THE NEWS DIGEST MAGAZINE

RAY T. BAYLESS, Publishing Director — MARJORIE R. HYSLOP, Editor — GEORGE H. LOUGHNER, Production Manager

VOLUME XXII, No. 9 — **September, 1949**

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TOLD YOU: *With hundreds of lectures and papers, plus eight special round table sessions devoted to study and discussion of ways and means of reducing unit costs.*

SHOWED YOU: *With over 300 operating displays that demonstrate how products, processes and equipment will increase production efficiency.*

Plan to attend the sessions, see the displays and operating films that will be shown in the Economy Theatre in the Auditorium. Be among more than 30,000 management, engineering and purchasing officials in the Metal Industry who will attend.

Cleveland will be crowded during the METAL SHOW so make plans and secure hotel accommodations before it is too late.

If you haven't already made plans to show your products, processes, machinery and equipment at the Metal Show, make your space reservations now.

For full information and to make space reservations, write:
W. H. Eisenman (Managing Director)
National Metal Exposition
7301 Euclid Avenue, Cleveland 3, Ohio
or telephone UTah 1-0200

For hotel reservations, write:
Cleveland Housing Bureau
attention: Louise D. Perkins,
511 Terminal Tower, Cleveland 13, Ohio

31st National Metal Congress and Exposition

Featuring "Economy-in-Production"
Public Auditorium, Cleveland, Ohio
October 17 through 21, 1949

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A Cordial Invitation . . . .

ECONOMY is the watchword on the business horizon as fall approaches—not the economy that calls for drastic slashes in operating expense, or for widespread layoffs of personnel. It is rather "economy in production" — cutting costs by improved operating methods, by better equipment, by more suitable use of materials and processes.

And this is the kind of economy that will be the theme at the 31st National Metal Congress and Exposition in Cleveland Oct. 17 to 21. In exhibits, demonstrations, pictures, in discussions, and in technical papers, the entire Metal Show will be rife with ideas for cutting costs without the onus of stimulating recession.

A cordial—even an urgent—invitation is therefore extended to all members of the American Society for Metals, to the members of the cooperating societies, indeed to everyone who has an interest in the metal industry, to attend the convention in Cleveland. There are programs of interest to everyone. All of the events are described in detail on the following pages. Check the items of most importance to you, arrange your schedule to take best advantage of the week of Oct. 17, and mail the time-saving advance registration coupon on page 61.

HAROLD K. WORK
President
American Society for Metals

HOW "Economy-in-Production" can be achieved through improved methods and techniques, better equipment and more efficient plant operations will be demonstrated again and again in all phases of the multi-sided National Metal Congress and Exposition in Cleveland the week of Oct. 17. How to do it cheaper yet better will be the prevailing theme of this year's cost-cutting Congress.

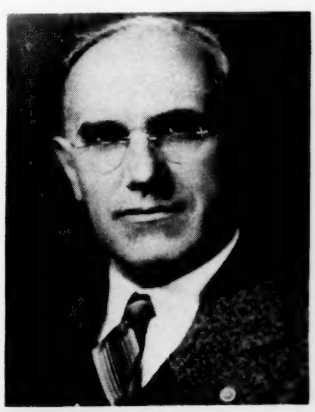
All through the Exposition in Cleveland's spacious Public Auditorium the theme will be dramatized by 325 leading metalworking firms of the country. By display and operating demonstrations they will show how production savings and short cuts can be effected through advanced methods and mechanization. A brief indication of the products and equipment that can be seen at the Show is given in the list of exhibitors on page 19.

A series of eight panel discussions will further point up the economy theme. All of them will be planned to show how improved metallurgical practices and equipment can be adopted to help cut costs and avoid waste. Improved cleaning and finishing methods, improved press shop operations, better heat treatments, machining methods, welding techniques, better use of alloys and mill products, more precise castings and formed shapes will be the specific subjects treated in the eight sessions.

These round-table discussions will

F. N. Rhines, Chairman
Inst. of Metals Div., A.I.M.E.

D. W. Smith, President
Society for Non-Destructive Testing



G. N. Sieger, President
American Welding Society

be patterned after the famous Sunday noon broadcasts of the University of Chicago. Each panel will consist of a chairman (or moderator) and four or five members. All these men will be expert in some field closely related to the main topic. The discussions will be extemporaneous and audience participation will be invited. A preliminary program indicating the various topics to be covered is given on page 14.

Another special feature of this year's Congress will be a series of "Economy Theaters". These theaters will be stationed at various places in the Public Auditorium and Underground Exposition Halls, where the Show itself will be presented. In the theaters a whole series of industrial motion picture films stressing economical production methods will be shown at stated intervals. Some 20 films provided by the exhibitors in the Metal Show are already scheduled. A list of titles and sponsoring companies is shown on page 7, and a time schedule of showings will be prominently posted at various places in the Auditorium.

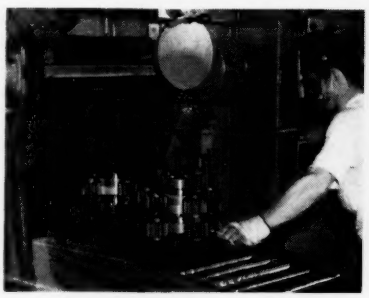
In addition to these special features, 291 technical papers dealing with all phases of the metal industry and metallurgical science will be presented in morning, afternoon and evening technical sessions. These sessions have all been arranged by the four cooperating societies sponsoring the Metal Congress. They are the American Society for Metals (headquarters at Statler Hotel), American Welding Society (Cleveland Hotel), Metals Branch of the American Institute of Mining and Metallurgical Engineers (Allerton Hotel), Society for Non-Destructive Testing (Statler Hotel). Complete programs listing titles and speakers, as well as educational courses, symposiums, special meetings and social events are given on the following pages.

The Exposition will be open from noon until 10:30 p.m. on Monday, Tuesday and Wednesday, Oct. 17, 18 and 19, and from 10:00 a.m. to 6:00 p.m. on Thursday and Friday, the 20th and 21st. Admission will be by membership card of the cooperating societies, by special invitation distributed by the exhibitors, or upon payment of a $1.00 registration fee.

Registration desks will be provided at the various headquarters hotels, as well as at Convention Hall. However, to relieve some of the congestion that is bound to occur during peak attendance hours, an advance registration form is provided on page 61 of this issue of *Metals Review*. This form should be filled out and mailed to Convention Hall prior to Oct. 10. An entrance badge will then be returned by mail that will gain admission during the entire week of the Exposition.

The technical sessions will convene in meeting rooms at the various headquarters hotels, with the exception of the A.S.M. afternoon and evening sessions, the A.S.M. morning sessions on Thursday and Friday and some of the Welding Society meetings. These will all be held at Convention Hall to facilitate attendance at the Exposition.

PANEL DISCUSSIONS FEATURE "ECONOMY-IN-PRODUCTION"



Through Heat Treatment . . .

Better Press Operations . . .

American Society for Metals Schedules Six Varieties of Technical Activities

The technical program of the American Society for Metals during the National Metal Congress and Exposition will offer no less than six different varieties of scientific fare to gratify the appetites of all who attend the Metal Show in Cleveland.

Piece de resistance is, of course, the regular technical sessions—11 of them, morning and afternoon daily, Monday through Friday, Oct. 17 through 21. These sessions will be preceded on Saturday and Sunday by a substantial aperatif in the form of the Seminar on Thermodynamics in Physical Metallurgy.

Other courses include two series of educational lectures, and a group of eight panel discussions on "Economy in Production". For dessert a special Friday morning program has been arranged on "Atomic Energy Metallurgy".

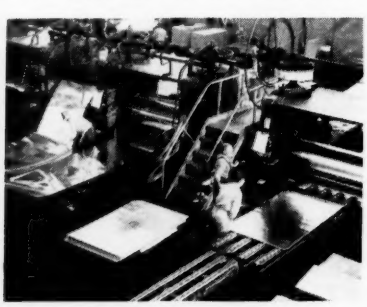
The seminar, which anticipates the official opening of the Metal Congress by two days, has become a popular annual event in the Metal Week plans. Highly technical though it is, the importance of the subject—Thermodynamics in Physical Metallurgy—is expected to attract a large and interested audience.

Clarence Zener, associate director, Institute for the Study of Metals, University of Chicago, is responsible for arranging the program, planning the subjects and selecting the speakers. The seminar will be presented in five sessions Saturday morning, afternoon and evening, and Sunday morning and afternoon. Fifteen of the country's leading metallurgists, mathematicians, physicists and researchers will participate, as shown by the detailed program on page 14. All of the meetings will be held at the Statler Hotel, Cleveland.

The complete programs of the two lecture courses are shown on page 15. The first course on "Machin-

PANEL DISCUSSIONS FEATURE "ECONOMY-IN-PRODUCTION"

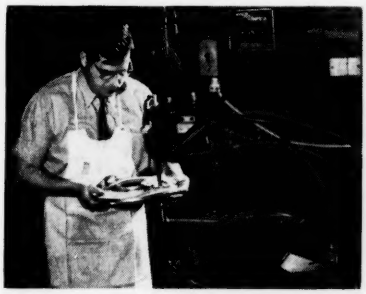
Through Finishing . . .



Improved Mill Shapes . . .

NOTE: Photographs on this page are reproduced through the courtesy of Allison Division, General Motors Corp. (heat treatment), E. F. Houghton & Co. (press operations), and Republic Steel Corp. (finishing).

PANEL DISCUSSIONS FEATURE "ECONOMY-IN-PRODUCTION"



Through Welding . . .

More Precise Castings . . .

ing—Theory and Practice" will be presented by 13 lecturers in four sessions in the late afternoon and evening on Monday and Tuesday, Oct. 17 and 18. John F. Kahles, associate professor of metallurgical engineering, University of Cincinnati, and a member of the A.S.M. Educational Committee, is coordinator for the course, selecting the topics and speakers.

The course on "Stress-Corrosion in Metals" is in charge of F. L. LaQue, head of the corrosion engineering section, International Nickel Co., Inc. The three lectures in the series will be presented on Wednesday, Oct. 19, at 4:15, 5:15 and 8:00 p.m. Both of the lecture courses will be held in the Cleveland Public Auditorium.

The panel discussions on "Economy in Production" will differ from the regular technical programs in that they will be informal audience-participation question-and-answer programs rather than formal presentations of papers and discussions. Practical problems of cost-cutting methods and plant operations will be threshed out by panels of experts. Subjects of the discussions are given on page 14.

The special Friday morning program on Atomic Energy Metallurgy will be given by such authoritative speakers as members of the Knolls Atomic Power Laboratory staff, the Los Alamos Scientific Laboratory, the Ames Laboratory, the Naval Research Laboratory, M.I.T., and Westinghouse's atomic power division. Aspects of the metallurgy of both beryllium and uranium will be covered, as well as the effects of radiation on materials.

A.S.M. morning sessions and meetings on Monday, Tuesday and Wednesday will be held at the Statler Hotel. Thursday and Friday morning sessions and all of the afternoon and evening gatherings (except the Saturday and Sunday Seminar) will be at the Public Auditorium, scene of the National Metal Exposition.

The most important event of the regular technical program will occur on Wednesday morning, when the American Society for Metals will hold its annual meeting, followed immediately by the Edward deMille Campbell Memorial Lecture.

Metallographic Exhibit Prizes Are Open to All

An opportunity for metallographers to display their best work will be provided at the National Metal Exposition in a prominent space reserved for the Fourth A.S.M. Metallographic Exhibit.

A grand prize of $100 will be awarded for the micrograph judged the "best in show". First prize and honorable mentions will also be given in each of eleven classifications. All of the entries will be prominently hung in a special area in Cleveland's Public Auditorium, and the prize-winning micros will be selected by a committee of judges. The grand prize winner will become the property of the American Society for Metals, for preservation and display in the Sauveur Room at the Society's headquarters.

All interested metallographers are invited to submit their best work. Entries should be mailed between Oct. 1 and Oct. 12, addressed to Metallographic Exhibit, c/o W. H. Eisenman, National Metal Congress and Exposition, Cleveland Public Auditorium, Cleveland, Ohio. The complete rules for submission of micrographs are given on page 2.

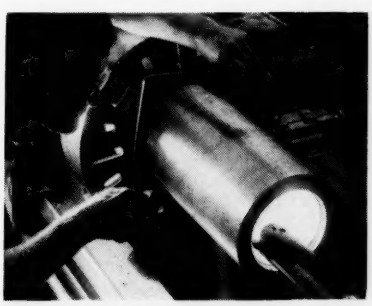
NOTE: Photographs on this page courtesy of Dow Chemical Co. (welding), Battelle Memorial Institute (casting), Westinghouse Electric Corp. (machining and brazing).

Economy Theaters Schedule 23 Films

A tentative list of titles and sponsors of the films to be shown in the "Economy Theaters" is given below. The theaters will be stationed at various locations in the Cleveland Public Auditorium, and a time schedule for showings will be posted.

Hidden World
Allis Chalmers Mfg. Co.
This Is Aluminum
Aluminum Co. of America
The Story of an Ore Sample
American Cyanamid Co.
Sheet Metal and Plate Cutting Machinery
American Pullmax Co.
Functional Photography in Modern Industry
Distillation Products, Inc. (Eastman Kodak Co.)
To Be Announced DoAll Co.
Arc Welding at Work
This Is Resistance Welding
General Electric Co.
Designing Machinery for Arc Welding
Lincoln Electric Co.
Steel Shapes for Industry
Lukens Steel Co.
This Hidden World
Malleable Founders Society
The Story of Slab 37
Master Builders Co.
Mass Production of Massive Parts
Metal & Thermit Corp.
Die Casting New Jersey Zinc Co.
Induction Heating for Forging
Ohio Crankshaft Co.
Cylinder Block Cleaning at Ford Motor Co. Pangborn Corp.
Grinding and Use of Lathe Tool Cutter Bits
South Bend Lathe Works
The Speed Nut Savings Factor
Tinnerman Products, Inc.
The One-Man Gang
Towmotor Corp.
Colmonoy No. 6
Colmonoy Spraywelder
Wall Colmonoy Corp.
Advantages of A. C. Welding
Radio-Frequency Heating
Westinghouse Jet Engine
Westinghouse Electric Corp.

PANEL DISCUSSIONS FEATURE "ECONOMY-IN-PRODUCTION"



Through Machining . . .

Through Brazing . . .

Eighty Technical Papers to Be Given At American Welding Society Sessions

The American Welding Society's three-ring program for the National Metal Congress (three simultaneous sessions daily, morning and afternoon) offers 80 technical papers for those who would learn more about welding. To minimize overlapping of interest in these simultaneous sessions, the papers are grouped by subject.

One of the Monday morning sessions, for instance, is devoted to structural design, another to welding of pressure vessels, and the third to hard facing and flame hardening. Resistance welding forms the subject of three successive sessions, while a symposium on ship structure research occupies a morning and afternoon period on Tuesday. Sessions are given over to welding of nonferrous metals, of aluminum, and of stainless steel, while weldability, inert-gas welding, and gas cutting are some of the other timely topics.

The "Economy-in-Production" theme of this year's Metal Congress is supplemented by the American Welding Society's theme, "For Economy in Production—Weld!" Tying in with this theme on Thursday evening the Welding Society will provide a special session on "Importance of Welding to Management, the Engineer and the Public". The session will be nontechnical in character and aimed at demonstrating the advantages of welding to management, the designer and the consumer.

Likewise, the special lecture course on "Designing for Welding" will doubtless point up many cost-cutting features. This lecture series, scheduled for Monday, Tuesday and Wednesday afternoons at 4:30, will be presented by H. W. Pierce, assistant to the president, New York Shipbuilding Corp.

Another important event will take place on Monday evening, when A.W.S. members will congregate for the awards of prizes and medals, and the 1949 Adams Lecture. This important paper will be presented by W. M. Wilson of University of Illinois, who will talk about the advantages and disadvantages of electric welding.

Prior to the lecture the Samuel Wylie Miller Memorial Medal will be awarded to A. G. Bissell, principal engineer, Bureau of Ships, Navy Department. This award is made annually to the person judged most deserving for conspicuous contributions to the advancement of the welding or cutting of metals.

The A. F. Davis Undergraduate Welding Awards will also be presented to student authors and undergraduate magazines for the best articles published on welding. First prize will go to Jim Snider of Texas Agricultural and Mechanical College for an article in the *Engineer,* and second prize to David S. Wise of University of Michigan and to the *Michigan Technic.*

Changing a time-honored custom, the Welding Society this year is combining the President's Reception (traditionally held on the Sunday afternoon before the opening of the Metal Congress) and the annual banquet. The President's Reception this year will be held Tuesday evening, and will consist of a buffet dinner and pay-as-you-go bar, with dancing and music.

Headquarters for the American Welding Society will be the Cleveland Hotel, where all of the meetings and sessions will be held, with the exception of the lecture course on Designing for Welding, and the Thursday evening meeting on Economy in Production. These two events will be held in the Public Auditorium in Parlor B, third floor.

The complete program of the American Welding Society is given on page 17.

U.S. Steel President Is Principal Speaker At A. S. M. Banquet

Principal speaker at the Annual Banquet of the American Society for Metals will be Benjamin F. Fairless, president of United States Steel Corp. The banquet will be held at the Statler Hotel, Cleveland, on Thursday, Oct. 20.

B. F. Fairless

Son of a coal miner, Mr. Fairless earned his way through college, graduating with a degree in civil engineering in 1913. He got into the steel business that same year as civil engineer for Central Steel Co. of Massillon, Ohio. Steps upward followed in rapid succession until he became president of Central Alloy Steel Co. in 1928, executive vice-president of Republic Steel in 1930, and president of the newly created Carnegie-Illinois Steel Corp. in 1935. In 1938 he was elected president of the entire Steel Corporation.

Sharing the spotlight at the speakers' table during the banquet will also be the winners of various awards, medals and honors, with formal presentations to be made during the course of the evening.

Tickets for the banquet are $7.50 and tables will seat ten. Advance reservations should be mailed to American Society for Metals, 7301 Euclid Ave., Cleveland 3.

E. H. Dix Will Present Campbell Memorial Lecture On Wednesday Morning

Climax of the A.S.M. technical program during the National Metal Congress is the Edward deMille Campbell Memorial Lecture, to be presented on Wednesday morning, Oct. 19, immediately following the annual meeting of the Society.

While the title of the paper has not yet been announced, it is a foregone conclusion that it will have something to do with aluminum, since the speaker is to be Edgar H. Dix, Jr., assistant director of research and

chief metallurgist of the Aluminum Research Laboratories, Aluminum Co. of America.

Mr. Dix began his research on aluminum 30 years ago, when he joined the Aluminum Castings Co. as assistant engineer of tests in 1919. (He had received his M.E. degree in 1914 and M.M.E. degree in 1916, both from Cornell University.) This research continued in 1921 while he was chief of the Metals Branch, Engineering Division, Air Service, at McCook Field. Since 1923 he has been directing metallurgical research for Alcoa, and in 1942 was appointed assistant director of research.

Mr. Dix is the author of about 75 publications on aluminum and nonferrous metallurgy. As a result of his experimentation with aluminum alloys, he was issued a patent in 1932 on the method of making Alclad—a material now well known and widely used for its good corrosion resistance combined with high strength.

He has served as chairman of the Pittsburgh Chapter A.S.M. (1931-32) and on the Society's Publications Committee (1940-43). He is also active in the A.I.M.E., serving as chairman of the Pittsburgh Section (1935-37), chairman of the Institute of Metals Division (1936-37), and Institute of Metals Division lecturer (1940). In 1947 he was awarded the Clamer Medal of the Franklin Institute for his work in the development of Alclad.

To Direct Seminar and Lecture Courses

F. L. LaQue *John F. Kahles* *Clarence Zener*

F. L. LaQue of International Nickel Co. is coordinator for the A. S. M. lecture course on Stress-Corrosion in Metals, while John F. Kahles of University of Cincinnati is coordinator for the course on Machining. Clarence Zener, Institute for the Study of Metals, University of Chicago, planned the Seminar on Thermodynamics in Physical Metallurgy

Institute of Metals Division of A.I.M.E. Has 3-Day Program

The first three days of the National Metal Congress—Oct. 17, 18 and 19 in Cleveland—will be full ones for the members of the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers. Three simultaneous technical sessions are scheduled for both morning and afternoon, with committee meetings, luncheons, and the Institute's annual Fall Dinner thrown in.

Headquarters for the A.I.M.E. are at the Allerton Hotel, where all of the meetings will be held. The annual Fall Dinner will be held on Tuesday, Oct. 18, preceded by a cocktail party at 6:00 o'clock, given with the compliments of the Cleveland members of A.I.M.E. Frederick N. Rhines of Carnegie Institute of Technology, chairman of the Institute of Metals Division, will be toastmaster at the dinner, and John M. Kiefer of American Steel and Wire Co., chairman of the Cleveland Section, will give the welcome. The principal speaker has not yet been announced.

The Executive Committee of the Institute of Metals Division will have a luncheon and meeting on Tuesday. There will also be meetings of the Powder Metallurgy Committee and the *Journal of Metals* Editorial Advisory Committee sometime during the three-day program.

Registration fee for the meetings will be $2 to members and $4 to nonmembers.

Walter A. Dean, assistant manager of the permanent mold plant, Aluminum Co. of America, is chairman of the program committee. The complete program is given on page 16.

Non-Destructive Testing Program Emphasizes Industrial Aspects

Industrial aspects of nondestructive testing will be emphasized by the Society for Non-Destructive Testing in its two-day program during the National Metal Congress and Exposition. Four technical sessions are planned on Wednesday and Thursday, Oct. 19 and 20.

The program will open on Wednesday morning with a session on techniques and equipment. The afternoon will be devoted to industrial applications of nondestructive testing, while the Thursday morning meeting will have four papers on careers in this field and on management aspects.

Emphasis on this latter phase is somewhat of an innovation in the Society's program. The session reflects the current interest being displayed on the part of management in nondestructive evaluation of products and the desirability of assigning responsibility at the proper level and in the proper department.

The program will culminate on Thursday afternoon with the Lester Lecture (named to honor H. H. Lester of Watertown Arsenal, a pioneer in the field of industrial radiography). The Lester Lecture will be followed immediately by the annual meeting of the Society.

All of the meetings will be held at the Statler Hotel in Cleveland. The complete program of papers and speakers is shown on page 13.

AVOID DELAY AT THE REGISTRATION DESK

See page 61 for Metal Show Advance Registration Coupon

Haggerson Awarded Research Medal

Fred H. Haggerson, one of the country's leading industrialists and an exponent of consistent research, will be honored during the National Metal Congress in Cleveland when he receives the A.S.M. Medal for the Advancement of Research. Mr. Haggerson is president of Union Carbide and Carbon Corp., New York.

Presentation of the medal, plaque and citation will be made at the annual banquet of the American Society for Metals at Cleveland's Statler Hotel on Thursday, Oct. 20.

"For a period of 20 years," says the citation which will be read at

that time, "Mr. Haggerson has been an outstanding example of the modern executive in a manufacturing enterprise, employing industrial research as an effective aid in the achievement of commendable business objectives. Through the continuous support of sustained research, of which a considerable part is metallurgical in nature, dealing with new alloys and their properties, alloying and accessory steelmaking materials, as well as welding methods and the application of oxygen and acetylene in steelmaking, Mr. Haggerson has advanced technological progress in broad fields of the metal industries to the ultimate benefit of the consuming public."

Requirements of the candidate to receive this medal are that he shall be an executive in an industrial organization, the principal activity of which is the production and fabrication of metals. He must have consistently sponsored metallurgical research or development, and have made available financial support, thus helping to advance the arts and sciences relating to metals.

In addition to being executive head of Union Carbide and Carbon Corp., Mr. Haggerson is chairman of Union Carbide of Canada, and a director of Dominion Mines and Quarries, Ltd., of Electro Metallurgical Co., Haynes Stellite Co., and others.

Grossmann's Pioneering Achievements Recognized By Sauveur Award

Marcus A. Grossmann, director of research, Carnegie-Illinois Steel Corp., will be the recipient of the Albert Sauveur Achievement Award of the American Society for Metals on Oct. 20 during the National Metal Congress in Cleveland.

M. A. Grossmann

Born and raised in Youngstown, Ohio, young Grossmann succumbed to the lure of the steel mills early in life, and therefore chose M.I.T. and metallurgy for his schooling. His first research discovery was made prior to World War I while working for Vanadium Corp. of America.

Subsequently he became chief metallurgist for Electric Alloy Steel Co., and then metallurgist for United Alloy Steel Co., which eventually became part of Republic Steel Corp. As recipient of the Sauveur Medal, it is appropriate that he should have pursued his advanced studies under Professor Sauveur at Harvard, where he won his Ph.D. in 1931 with a thesis on "Oxygen in Steel". He has been with the U. S. Steel Corp. subsidiaries since that time.

Dr. Grossmann is the author of a famous and lucid text on "Principles of Heat Treatment", now in its third edition. He is a former Campbell Lecturer, Howe Medalist, A.S.M. past president, and recipient of an Alloy Steel Distinguished Service Award.

The purpose of the Sauveur Award is to recognize pioneering metallurgical achievements which have stimulated organized work along similar lines to such an extent that a marked basic advance has been made in metallurgical knowledge.

Entertainment Prepared For Congress Ladies

A varied program of entertainment is being prepared for the ladies attending the National Metal Congress in Cleveland.

One of the first events will be a luncheon at the Statler Hotel with style show provided by Cleveland's beautiful new Linder-Davis department store. Sightseeing tours around the city and suburbs, bridge and Canasta parties are among the other features on the program. Headquarters and registration for the ladies will be maintained in the Statler, Cleveland and Allerton Hotels, headquarters of the various cooperating societies. A nominal registration fee will be required to cover a portion of the expense involved.

Gold Medal, Top A.S.M. Honor, to Be Conferred Upon E. C. Bain at Banquet

E. C. Bain

The highly prized and infrequently awarded Gold Medal of the American Society for Metals will be conferred this year upon Edgar Collins Bain, vice-president in charge of research and technology for Carnegie-Illinois Steel Corp., and a past president of the American Society for Metals. The presentation will be made on Oct. 20, during the annual banquet.

"Since the beginning of his professional career in 1919," says the citation that will accompany the medal, "he has exhibited exceptional ability in the diagnosis and solution of diversified metallurgical problems. One of the first Americans to study metals with X-rays, he therewith clarified the essential nature of solid solutions . . . initiated and supervised work on isothermal transformation . . . and isolated the metallurgical constituent now called bainite in his honor."

Dr. Bain received his B.S. in 1912 and his M.S. four years later from Ohio State University. A doctor's degree was awarded by Lehigh University in 1936. After the first world war he was successively chemical engineer for B. F. Goodrich Co., metallurgist for National Lamp Co., research metallurgist for Atlas Steel Co., and a staff member of the Union Carbide and Carbon Research Laboratories. He joined the U. S. Steel Corp. Research Laboratory in 1928, progressing rapidly through the years to his present position with the Corporation's subsidiary, Carnegie-Illinois.

Few men have succeeded in accumulating a comparable array of medals, awards, lectureships and honors in the metals field as have been bestowed on the 1949 Gold Medalist. In A.S.M. alone—and honors from other technical societies, publications and colleges have been just as numerous—he is a Howe Medalist, Campbell Lecturer, recipient of the Sauveur Achievement Award, and a Distinguished Service Award for meritorious contributions to progress in alloy steel. His book on "Functions of the Alloying Elements in Steel" is said to constitute the first comprehensive and quantitative appraisal of the whole field.

Announcement has just been made that Dr. Bain has been awarded the John Price Wetherill Medal of the Franklin Institute.

Industrial Gas Breakfast Set for Tuesday A. M.

The week of October 17 to 21 will hold much of interest for industrial gas men and members of the Industrial and Commercial Gas Section, American Gas Association. During that week A.G.A. will sponsor a combined exhibit of industrial gas equipment at the National Metal Exposition, Public Auditorium, Cleveland.

The 12th annual Industrial Gas Breakfast will be held on Tuesday morning, Oct. 18 at 8:30 a.m. in the Assembly Room of the Hollenden Hotel. This traditional and popular breakfast is given for the editors of the metals magazines and is also attended by every gas man who can possibly get there. The speaker for the occasion will be E. L. Shaner, publisher of *Steel*.

Running concurrently with the Metal Show will be the A.G.A. Annual Convention in Chicago. It has been suggested that industrial gas men planning to visit the Metal Show in Cleveland do so on Monday and Tuesday, Oct. 17 and 18.

The formal luncheon and session of the Industrial and Commercial Gas Section will be held in Chicago on Wednesday, Oct. 19.

Naval Research Lab Meets

The Naval Research Laboratory of Washington, D. C., is planning to hold an alumni luncheon during the National Metal Congress in Cleveland. The luncheon will be held at the Hollenden Hotel on Wednesday, Oct. 19, at noon.

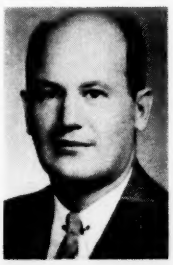
This luncheon is open to all former and present members of the staff of the Naval Research Laboratory, who are attending the National Metal Exposition. Reservations should be sent to C. E. Jackson, 1301 Roselle Ave., Niagara Falls, N. Y.

Gun Committee Plans Reunion

The Metallurgical Advisory Committee on Guns will hold a reunion dinner meeting during the National Metal Congress in Cleveland. The dinner will be given at the Statler Hotel on Wednesday evening, Oct. 19, at 6:30 p. m. Arrangements are in the hands of A. O. Schaefer, assistant to the executive vice-president, Midvale Co., Nicetown, Philadelphia.

Howe Medal Honors Transactions Authors

A notable scientific investigation which has been under way at Massachusetts Institute of Technology for some years shows how the kinetics of martensite and retained austenite decomposition can be studied by observing dimensional changes in steels. The results of these investigations have been reported in a series of papers published in the A.S.M. *Transactions*. One of the papers in the series has now brought to its authors the coveted Henry Marion Howe Medal of the American Society for Metals.



M. Cohen

B. L. Averbach, Morris Cohen and Stewart G. Fletcher are the authors of this prize-winning paper, which carries the title, "The Dimensional Stability of Steel. Part III — Decomposition of Martensite and Austenite at Room Temperature". It was published in Volume 40 of the A.S.M. *Transactions* for 1948.

B. L. Averbach

For two of the authors—Messrs. Cohen and Fletcher—this represents the second Howe Medal award. The first medal was presented to them for the best paper published in the *Transactions* in 1944.

S. G. Fletcher

B. L. Averbach is assistant professor of metallurgy at M.I.T., while Morris Cohen is professor of physical metallurgy. Dr. Fletcher was also a member of the Institute staff for some time after receiving his D.Sc. in metallurgy in 1943; he is now chief metallurgist for Latrobe Electric Steel Co.

Dr. Cohen received his B.Sc. at M.I.T. in 1933, and has since progressed from an assistantship through instructor to professor. During the National Metal Congress a year ago, he delivered the Campbell Memorial Lecture of the A.S.M. on the subject of "Retained Austenite".

Dr. Averbach received his Bachelor's and Master's degrees from Rensselaer Polytechnic Institute, and after a few years in industry, entered the graduate school at M.I.T. in 1945. He received his doctorate in metallurgy two years later, and is now assistant professor of metallurgy.

Presentation of the Howe Medal will be made at the annual banquet of the American Society for Metals on Thursday, Oct. 20.

Twenty Schools Schedule Alumni Luncheons

Twenty or more technical schools and colleges will hold alumni luncheons on Wednesday, Oct. 19, during the National Metal Congress and Exposition. These annual reunions provide a splendid opportunity for former metallurgical students to renew old acquaintances and memories.

The luncheons are scheduled for 12 noon immediately following the Campbell Memorial Lecture and annual meeting of the A.S.M. The sponsoring groups and hotel locations of the luncheons will be published in the Official Program of the Metal Congress.

Reservations must be made by 6:00 p.m. of the day preceding the luncheons. They can be made and tickets purchased at the registration desks in the Public Auditorium or at the Statler Hotel.

Canadian Luncheon Planned

The six Canadian chapters of the American Society for Metals will again participate in the annual Canadian Luncheon during the National Metal Congress in Cleveland. The luncheon will be held on Tuesday, Oct. 18 in the Statler Hotel, with members from the Montreal, Ontario, British Columbia, Manitoba, Ottawa Valley, and Western Ontario Chapters attending. Tickets must be purchased in advance, either at the registration desk at the Statler Hotel or at the Public Auditorium.

Chapter Chairmen to Meet

The annual A.S.M. Chapter Chairmen's Breakfast will be held Wednesday morning, Oct. 19, at 8:00 a.m. at the Statler Hotel, Cleveland, as a feature of the National Metal Congress.

The board of trustees will attend the Chairmen's Breakfast and president Work will preside. Topics of interest pertaining to the functioning of chapters will be presented for open discussion.

AVOID DELAY AT THE REGISTRATION DESK

See page 61 for Metal Show Advance Registration Coupon

National Officers To Be Installed

New Officers of the American Society for Metals will be installed at the annual meeting of the Society on Wednesday morning, Oct. 19, during the National Metal Congress in Cleveland. The meeting will be held in the ballroom of the Statler Hotel. At that time the secretary will cast a unanimous ballot for the election of these officers.

The new officers were selected by the nominating committee last May, and in accordance with the constitution of the A.S.M., no additional nominations having been received by July 15, nominations were declared closed.

Taking the chair as president will be Arthur E. Focke, chief metallurgist, Diamond Chain Co., Inc., while Walter E. Jominy, staff engineer of Chrysler Corp., will be installed as vice-president. The new treasurer will be Ralph L. Wilson, chief metallurgical engineer for Timken Steel and Tube Division.

Arthur E. Focke
President-Elect A. S. M.

Two new trustees will be Elmer Gammeter, chief metallurgist for Globe Steel Tubes Co., and Thomas G. Digges, metallurgist at the National Bureau of Standards.

During the annual meeting the president, secretary and treasurer will give their reports covering activities of the Society during the past year. Immediately following the meeting, the Campbell Memorial Lecture will be presented by Edgar H. Dix, Jr., assistant director of research and chief metallurgist for Aluminum Co. of America.

In addition to the new officers named above, the board of trustees includes W. H. Eisenman, secretary; Frederick J. Robbins, president, Sierra Drawn Steel Corp., trustee; Harry P. Croft, consulting metallurgist, trustee; and Harold K. Work, director of research, College of Engineering, New York University, immediate past president.

American Society for Metals

Technical and Convention Program

Statler Hotel and Public Auditorium

Cleveland, Oct. 17-21, 1949

Monday, Oct. 17

9:30 a. m.—Grand Ballroom
Hotel Statler

ALLOY STEELS SESSION—I

Joint Chairmen

W. R. Breeler & M. F. Hawkes

Tensile Properties of a Heat Treated Low-Alloy Steel at Subzero Temperatures, by E. J. Ripling, research associate, Case Institute of Technology.

Relationship of Inclusion Content and Transverse Ductility of a Chromium-Nickel-Molybdenum Gun Steel, by John Welchner, metallurgical engineer, and Walter G. Hildorf, metallurgical consultant, Timken Roller Bearing Co.

The Effect of Vanadium and Carbon on the Constitution of High Speed Steel, by Donald J. Blickwede, head, high-temperature alloys section, Naval Research Laboratory; Morris Cohen, professor of physical metallurgy, Massachusetts Institute of Technology, and George A. Roberts, Vanadium-Alloys Steel Co.

Unnotched Impact Strength of High Speed Steels, by Arthur H. Grobe, research metallurgist, and George A. Roberts, chief metallurgist, Vanadium-Alloys Steel Co.

2.00 p. m.—Music Hall
Public Auditorium

ALLOY STEELS SESSION—II

Joint Chairmen

R. S. Archer & G. A. Roberts

Effect of Boron and Kind of Boron Addition Upon the Properties of Steel, by R. A. Grange and W. B. Seens, members of staff, U. S. Steel Corp. Research Laboratory, and W. S. Holt and T. M. Garvey, metallurgical department, Carnegie-Illinois Steel Corp.

Characteristics and Properties of Cast Low-Chromium-Molybdenum Steels, by N. A. Ziegler, research metallurgist, W. L. Meinhart, assistant research metallurgist, and J. R. Goldsmith, metallurgical engineer in charge of research foundry, Crane Co.

Iron-Manganese and Iron-Manganese-Nickel Alloys, by Irvin R. Kramer, head, mechanics and materials branch, Office of Naval Research, Stewart L. Toleman, metallurgist, Naval Research Laboratory, and Walter T. Haswell, metallurgist, Latrobe Steel Co.

Metallurgical Factors Affecting the Magnetic and Mechanical Properties of Iron-Cobalt Alloys, by J. K. Stanley, magnetic dept., Westinghouse Electric Corp.

Tuesday, Oct. 18

9:30 a. m.—Grand Ballroom
Hotel Statler

OXIDATION SESSION

Joint Chairmen

M. G. Fontana & C. A. Zapffe

The High-Temperature Oxidation of Manganese, by R. S. Gurnick, research engineer, Thompson Products Inc., and W. M. Baldwin, Jr., research professor, Case Institute of Technology.

Determination of Oxygen in Metals by the Vacuum Fusion Method, by R. K. McGeary, J. K. Stanley, and T. D. Yensen, Westinghouse Research Laboratories.

Methods of Determining Vapor Pressure of Metals, by Rudolph Speiser, department of metallurgy, and H. L. Johnston, director, Cryogenic Laboratory, Ohio State University.

An X-Ray Study of the Scale Formed on Iron Between 400 and 700° C., by O. A. Tesche, Government Metallurgical Lab., University of the Witwatersrand, Johannesburg, S. Africa.

9:30 a. m.—Euclid Ballroom
Hotel Statler

QUENCHING SESSION

Joint Chairmen

M. Cohen & E. S. Rowland

A Quench Cracking Susceptibility Test for Hollow Cylinders, by Cyril Wells, member of staff, metals research lab., Carnegie Institute of Technology, C. F. Sawyer, metallurgist, Vanadium-Alloys Steel Co., I. Broverman, Los Alamos Scientific Lab., and R. F. Mehl, director, metals research lab., Carnegie Institute of Technology.

An Engineering Analysis of the Problem of Quench Cracking in Steel, by J. W. Spretnak, associate professor of metallurgy, Ohio State University, and Cyril Wells, member of staff, metals research lab., Carnegie Institute of Technology.

Pre-Bore Quench for Hollow Cylinders, by J. W. Spretnak, associate professor of metallurgy, Ohio State University, and C. C. Busby, metals research lab., Carnegie Institute of Technology.

Statistical Methods for Evaluating the Quality of Certain Wrought Steel Products, by Edwin G. Olds, associate professor, mathematics dept., and Cyril Wells, member of staff, metals research lab., Carnegie Institute of Technology.

12:00 m.—Hotel Statler

CANADIAN LUNCHEON

2:00 p. m.—Music Hall
Public Auditorium

HIGH-TEMPERATURE METALLURGY SESSION

Joint Chairmen

H. C. Cross & J. J. Kanter

Influence of Strain Rate and Temperature on the Creep of Cold Drawn Ingot Iron, by W. D. Jenkins and T. G. Digges, chief, thermal metallurgy, National Bureau of Standards.

Stability of AISI Alloy Steels at Elevated Temperatures, by A. B. Wilder, chief metallurgist, National Tube Co., and J. O. Light, chief metallurgist, Lorain Works, National Tube Co.

On the Extrapolation of Short-Time Stress-Rupture Data, by N. J. Grant, associate professor of metallurgy, and Albert G. Bucklin, research assistant in metallurgy, Massachusetts Institute of Technology.

The Tungsten-Iridium Thermocouple for Very High Temperatures, by Walter C. Troy, supervisor, and Gary Steven, research metallurgist, metals department, Armour Research Foundation.

Wednesday, Oct. 19

8:00 a. m.—Hotel Statler

CHAPTER CHAIRMEN'S BREAKFAST

10:00 a. m.—Grand Ballroom
Hotel Statler

A. S. M. ANNUAL MEETING

Edward DeMille Campbell Memorial Lecture, by E. H. Dix, Jr., assistant director of research, Aluminum Co. of America.

12:00 m.—Hotel Statler and Other Downtown Hotels

COLLEGE ALUMNI LUNCHEONS

2:00 p. m.—Music Hall
Public Auditorium

TRANSFORMATION AND TEMPER BRITTLENESS SESSION

Joint Chairmen

G. A. Timmons & A. R. Troiano

Measurement of Retained Austenite in Carbon Steels, by B. L. Averbach, assistant professor, L. S. Castleman, research assistant, and M. Cohen, professor of metallurgy, Massachusetts Institute of Technology.

The Effect of Alloying Elements on the Transformation Characteristics of Induction Heated Steels, by J. F. Libsch, assistant professor of met-

allurgy, and W. P. Chuang and W. J. Murphy, graduate students, Lehigh University.

Influence of Composiiton on Temper Brittleness in Alloy Steels, by A. P. Taber, Colonel, Ordnance Dept., J. F. Thorlin, Lt. Colonel, Aberdeen Proving Ground, and J. F. Wallace, metallurgist, Watertown Arsenal.

Isothermal Temper Embrittlement, by L. D. Jaffe and D. C. Buffum, Watertown Arsenal Laboratory.

Other special programs planned by A. S. M. are the Seminar on "Thermodynamics in Physical Metallurgy" (page 14); Panel Discussions on Economy in Production (program on page 14); Educational Lecture Courses on "Machining—Theory and Practice" and on "Stress-Corrosion in Metals" (page 15).

Thursday, Oct. 20

9:30 a. m.—Music Hall

Public Auditorium

STAINLESS STEELS SESSION

Joint Chairmen

Russell Franks & V. N. Krivobok

A Bar-Bend Test and Its Application to Stainless Steel, by C. A. Zapffe, R. L. Phebus and F. K. Landgraf, consultants.

Creep and Rupture of Several Chromium-Nickel Austenitic Stainless Steels, by G. V. Smith, E. J. Dulis and E. G. Houston, U. S. Steel Corp. Research Laboratory.

The Effect of Sigma Phase on the Short-Time High-Temperature Properties of 25 Chromium, 20 Nickel Stainless Steel, by Glen J. Guarnieri, James Miller and Frank J. Vawter, Cornell Aeronautical Laboratory, Inc.

Stress-Corrosion of a Stainless Steel Compressor, by Frank W. Davis, chief metallurgist, E. B. Badger & Sons Co.

2:00 p. m.—Music Hall

Public Auditorium

MECHANICAL METALLURGY SESSION

Joint Chairmen

M. Gensamer & I. R. Kramer

A Study With New Equipment of the Effects of Fatigue Stress on the Damping Capacity and Elasticity of Mild Steel, by B. J. Lazan, professor and head, department of materials engineering, Syracuse University.

Effect of Steady Stress on Fatigue Behavior of Aluminum, by J. A. Sauer, head, department of engineering mechanics, Pennsylvania State College, and D. C. Lemmon, General Electric Co.

New Criteria for Predicting the Press Performance of Deep Drawing Sheets, by W. T. Lankford, S. C. Snyder and J. A. Bauscher, research and development division, Carnegie-Illinois Steel Corp.

Fractographic Study of Deformation and Cleavage in Ingot Iron, by C. A. Zapffe and C. O. Worden, consultants.

7:00 p. m.—Ballroom

Hotel Statler

A. S. M. ANNUAL BANQUET

Friday, Oct. 21

9:30 a. m.—Music Hall

Public Auditorium

ATOMIC ENERGY METALLURGY SESSION

The Metallurgy of Beryllium, by A. R. Kaufmann, Massachusetts Institute of Technology.

The Effects of Radiation on Materials, by Sidney Siegel, atomic power division, Westinghouse Electric Corp., and Douglas Billington, Naval Research Laboratory.

Some Aspects of Uranium Metallurgy: Uranium Crystal Structure, by C. W. Tucker, Knolls Atomic Power Laboratory.

Elastic Constants of Uranium, by Henry L. Laquer, Wm. E. McGee and Myra F. Kilpatrick, Los Alamos Scientific Laboratory.

Uranium-Manganese and Uranium-Copper Alloy Systems, by H. A. Wilhelm and O. N. Carlson, Ames Laboratory, U. S. Atomic Energy Commission.

Thorium-Carbon System, by H. A. Wilhelm and Primo Chiotti, Ames Laboratory, A.E.C.

2:00 p. m.—Music Hall

Public Auditorium

NONFERROUS SESSION

Joint Chairmen

W. M. Baldwin, Jr. & K. R. Van Horn

Fabrication and Mechanical Properties of Ductile Zirconium, by E. T. Hayes, physical metallurgist, E. D. Dilling, metallurgist, and A. H. Roberson, metallurgist, Bureau of Mines, Northwest Electrodevelopment Laboratory.

A Study of Arc-Melted Molybdenum-Rich Chromium-Molybdenum Alloys, by Harold D. Kessler, research metallurgist, and M. Hansen, Armour Research Foundation.

Effects of Quenching Rate and Quench-Aging on the Tensile Properties of Aluminum Alloy 61S, by R. C. Lemon, research metallurgist, and H. Y. Hunsicker, assistant chief, Cleveland research division, Aluminum Co. of America.

Preparation of Metal Single Crystals, by A. N. Holden, research laboratory, General Electric Co.

Society for Non-Destructive Testing

Statler Hotel, Oct. 19 and 20, 1949

Wednesday, Oct. 19

Morning Session—Hotel Statler

NONDESTRUCTIVE TESTING TECHNIQUES AND EQUIPMENT

Chairman—Justin Schneeman

Radium, Tantalum and Cobalt as Sources of Radiation for Industrial Radiography, by G. H. Tenney, Los Alamos Scientific Laboratory.

Sonic Inspection by the Immersion Technique, by Donald Erdman, Triplett & Barton, Inc., and Rebecca Smith, Turbodyne Corp.

High-Voltage X-Ray Equipment and Technique, by E. E. Charlton, General Electric Research Laboratory.

Nondestructive Hardness Testing, by D. L. Palmer, Scintilla Magneto Co.

Xeroradiography—a Basic Development in X-Ray Nondestructive Testing, by R. C. McMaster, Battelle Memorial Institute.

Afternoon Session—Hotel Statler

INDUSTRIAL APPLICATIONS OF NONDESTRUCTIVE TESTING

Chairman—W. E. Thomas

Current Applications of Magnetic Analysis Inspection, by V. L. Spoley, Magnetic Analysis Corp.

Plastics Inspection by Special Low-Voltage X-Ray Equipment, by D. T. O'Connor, Naval Ordnance Laboratory.

Testing of Jet Engine Parts, by Tom Piper, Northrop Aircraft Co.

Simulated Service Testing for Establishing Nondestructive Testing Standards, by L. W. Ball, Naval Ordnance Laboratory.

Thursday, Oct. 20

Morning Session—Hotel Statler

NONDESTRUCTIVE TESTING IN INDUSTRIAL MANAGEMENT

Chairman—Leslie W. Ball

Training and Qualifications for a Career in a Commercial X-Ray and Nondestructive Testing Laboratory, by Justin Schneeman, X-Ray Products Corp.

Career Possibilities for Nondestructive Specialists in a Large Metallurgical Company, by Kent Van Horn, Aluminum Co. of America.

Peacetime Preparation for Quality Control During Industrial Mobilization, by W. R. Pabst, Quality Control Div., Navy Bureau of Ordnance.

Magnetic Inspection Methods, by L. A. Danse, General Motors Corp.

Afternoon Session— Hotel Statler

LESTER LECTURE

"Economy-in-Production" Panel Discussions

Sponsored by American Society for Metals
All Meetings in Ballroom, Public Auditorium
Cleveland, Oct. 18-21, 1949

Monday, Oct. 17, 2:00 p. m.

Economy-in-Production Through
BETTER CLEANING AND FINISHING METHODS

Subdivisions:
Metal Cleaning Processes and Applications
Metal Cleaning Equipment (Vapor, Dip)
Abrasive Cleaning (Tumbling)
Metal Plating
Chemical and Organic Coatings
Painting

Monday, 8:00 p. m.

Economy-in-Production Through
IMPROVED PRESS SHOP OPERATIONS

Dies, Die Materials, Die Maintenance
Progressive or Multi-Station Operations
Operations on Multi-Slide Headers
Spinning
Stretch Forming
More Adaptable Sheet and Strip
Lubricants

Tuesday, Oct. 18, 2:00 p. m.

Economy-in-Production Through
IMPROVED WELDING TECHNIQUES AND EQUIPMENT

Arc Welding
Submerged Arc Welding
Oxy-Acetylene Welding
Spot Welding
Protected Arc Welding
Weldability of Materials
Resistance Welding

Tuesday, 8:00 p. m.

Economy-in-Production Through
IMPROVED HEAT TREATMENT OPERATIONS

Commercial Heat Treating
Induction Hardening
Flame Hardening
General Plant Layouts
Atmospheres
Mass Production Methods
Salt Baths
Tools
Carburizing
Steel Selection

Wed., Oct. 19, 2:00 p. m.

Economy-in-Production Through
USE OF TAILOR-MADE ALLOYS OR MORE ADAPTABLE MILL PRODUCTS

Right Steel for the Purpose
Light Metals (Aluminum or Magnesium)
Nonferrous Metals (Brass or Bronze)
Shapes—Extrusions, Tubing, Wire, Bars
Clad, Galvanized, Tinned, Aluminum-Coated

Wednesday, 8:00 p. m.

Economy-in-Production Through
USE OF MORE PRECISE CASTINGS OR FORMED SHAPES

Sand Castings of Unusual Precision
Die Castings
Precision Castings
Extrusion
Drop Forging, Coining, and Heading
Ceramic Molds
Powder Metallurgy Methods

Thursday, Oct. 20, 2:00 p.m.

Economy-in-Production Through
IMPROVED METALLURGY IN MACHINE SHOP OPERATIONS

Toolsteels and carbides
Selection of Steels
Cold Worked, Sulphurized Steels
Heat Treating for Machinability
Machinable Brasses and Light Metals
Proper Use of Cutting Oils and Other Auxiliaries

Friday, Oct. 21, 2:00 p. m.

Economy-in-Production Through
USE OF BRAZING, SOLDERING AND WELDING FOR SUB-ASSEMBLIES

Silver Soldering
Brazing of Aluminum
Low-Temperature Soldering
Welding
Copper (Hydrogen) Brazing of Steel and Stainless

Thermodynamics in Physical Metallurgy

Seminar Sponsored by American Society for Metals
Statler Hotel, Oct. 15-16, 1949

Saturday, Oct. 15, 9:30 a. m.

The Principles of Thermodynamics, by P. W. Bridgman, professor of mathematics, Harvard University.

Contributions of Statistical Mechanics, by C. Zener, associate director, Institute for the Study of Metals, University of Chicago.

Application of Thermodynamics to Heterogeneous Equilibria, by L. S. Darken, research chemist, U. S. Steel Corp.

Application of Electromotive Force Measurements to Phase Equilibria, by F. J. Dunkerley, assistant professor of metallurgy, University of Pennsylvania.

Saturday, 2:00 p. m.

Some Physical Interpretations of Constitution Diagrams, by A. W. Lawson, associate professor of physics, Institute for the Study of Metals, University of Chicago.

Thermodynamics of Liquids, by John Chipman, head, department of metallurgy, Massachusetts Institute of Technology, and John F. Elliott.

Physical Factors Affecting Order, by C. E. Birchenall, assistant professor of metallurgy, Carnegie Institute of Technology.

Saturday, 8:00 p. m.

Mechanism of Diffusion, by Frederick Seitz, head, department of physics, Carnegie Institute of Technology.

Nucleation, by J. H. Hollomon, research associate, General Electric Co.

Sunday, Oct. 16, 9:30 a. m.

Precipitation, by Charles Wert, Institute for the Study of Metals, University of Chicago.

Eutectoid Decompositions, by John Fisher, research associate, General Electric Co.

Martensite Transformations, by Morris Cohen, professor of metallurgy, Massachusetts Institute of Technology.

Sunday, 2:00 p. m.

Magnetic Domains, by Lieuwe Dijkstra, research associate, Institute for the Study of Metals, University of Chicago.

Principles Governing Solidification, by D. Turnbull, research associate, General Electric Co.

Role of Thermodynamics in Metallurgical Research, by J. B. Austin, director, U. S. Steel Corp. Research Laboratories.

TWO EDUCATIONAL LECTURE COURSES, SPONSORED BY A. S. M.

Machining—Theory and Practice

All Sessions in Public Auditorium, Cleveland

Monday, Oct. 17

4:15 p. m.—Music Hall

Symposium Keynote, by Hans Ernst, director of research, Cincinnati Milling Machine Co.

Metal Cutting Research, by M. E. Merchant, physicist, Cincinnati Milling Machine Co.

Cutting Fluid Theory, by Milton Shaw, associate professor of mechanical engineering, Massachusetts Institute of Technology.

8:00 p. m.—Clubroom B

Materials and Machinability, by F. W. Boulger, supervising metallurgist, Battelle Memorial Institute.

Metallurgy and Machinability of Steels, by J. D. Armour, chief metallurgist, Union Drawn Steel Division, Republic Steel Corp.

Tool Steels, by George A. Roberts, chief metallurgist, Vanadium-Alloys Steel Co.

Tuesday, Oct. 18

4:15 p. m.—Music Hall

Cemented Carbide Tool Materials, by J. C. Redmond, Kennametal, Inc.

Heat in Metal Cutting, by A. O. Schmidt, research engineer, Kearney and Trecker.

Evaluation of Machinability, by Michael Field and N. Zlatin, Metcut Research Associates.

8:00 p. m.—Clubroom B

Tool Life Testing, by O. W. Boston, chairman, department of metal processing, University of Michigan.

Some Metallurgical Aspects of Grinding, by L. P. Tarasov, research metallurgist, Norton Co.

Economics of Machining, by W. W. Gilbert, assistant professor, University of Michigan.

Development of the Macrostructure of Metals by Machining, by L. M. Clarebrough and G. J. Ogilvie, University of Melbourne.

Stress Corrosion in Metals

Wednesday, Oct. 19

4:15 p. m.—Music Hall
Public Auditorium

Generalized Theory of Stress-Corrosion, by J. T. Waber, staff metallurgist, University of California, Los Alamos Scientific Laboratory.

5:15 p. m.—Music Hall
Public Auditorium

Corrosion Fatigue and Stress-Corrosion as Encountered in a Practical Way in the Petroleum Industry, by Fred Prange, Phillips Petroleum Co.

8:00 p. m.—Music Hall
Public Auditorium

Stress-Corrosion Phenomena Encountered With Stainless Steels and Other High Alloy Materials, by James J. Heger, Carnegie-Illinois Steel Corp.

Institute of Metals Division A.I.M.E.

Annual Fall Meeting, Hotel Allerton
Cleveland, Oct. 17 through 19, 1949

Monday, Oct. 17, 9:00 a. m.

PRECIPITATION AND AGING

Co-Chairmen

R. W. E. Leiter & T. L. Fritzlen

Precipitation Phenomena in the Solid Solution of Nitrogen and Carbon in Alpha Iron Below the Eutectoid Temperature, by L. J. Dijkstra, University of Chicago.

The Yielding and Strain-Aging of Nitrided Single Crystals of Iron, by H. Schwartzbart and J. R. Low, Jr., Pennsylvania State College.

The Effect of Quenching on the Age Hardening of Two Aluminum Alloys, by R. D. Barer and M. B. Bever, Massachusetts Institute of Technology.

Size Effects in Quenching High-Purity Precipitation-Hardenable Alloys, by W. L. Finlay, Remington Arms Co., Inc.

FRACTURE AND STRAIN PHENOMENA

Co-Chairmen

P. R. Kosting & J. J. Heger

A Metallographic Description of Fracture in Impact Specimens of Structural Steel, by M. Baeyertz, W. F. Craig, Jr. and E. S. Bumps, Armour Research Foundation.

The Effect of Ferrite Grain Size on Notch Toughness, by J. M. Hodge, R. D. Manning and H. M. Reichhold, Carnegie-Illinois Steel Corp.

Investigation of Temper Brittleness in Low Alloy Steels, by S. A. Herres and A. R. Elsea, Battelle Memorial Institute.

The Effects of Molybdenum and Commercial Ranges of Phosphorus on the Toughness of 0.40% Carbon Chromium Steels, by M. Baeyertz, W. F. Craig, Jr. and J. P. Sheehan, Armour Research Foundation.

RECRYSTALLIZATION

Co-Chairmen

W. R. Hibbard, Jr., & J. F. Burke

Secondary Recrystallization in Copper, by M. L. Kronberg and F. H. Wilson, American Brass Co.

Recovery and Recrystallization in Brass, by B. L. Averbach, Massachusetts Institute of Technology.

Recrystallization Texture and Coarsening Texture in High-Purity Aluminum, by P. A. Beck and Hsun Hu, University of Notre Dame.

Recrystallization and Microstructure of Aluminum Killed Deep Drawing Steel, by R. L. Rickett, U. S. Steel Corp.; S. H. Kalin, Carnegie-Illinois Steel Corp.; and J. T. MacKenzie, Jr., U. S. Steel Export Co.

Monday, Oct. 17, 2:00 p. m.

EQUILIBRIUM DIAGRAMS

Co-Chairmen

P. A. Beck & T. E. Leontis

The Beryllium-Iron System, by R. J. Teitel, Brookhaven National Laboratories, and M. Cohen, Massachusetts Institute of Technology.

The Ternary System, Copper-Manganese-Zinc, by T. R. Graham, J. R. Long, C. E. Armantrout and A. H. Roberson, U. S. Bureau of Mines.

Solubility of Titanium in Liquid Magnesium, by K. T. Aust and L. M. Pidgeon, University of Toronto.

Liquid Solubility of Manganese in a Magnesium-Aluminum-Tin Alloy, by B. J. Nelson and G. F. Sager, Aluminum Co. of America.

FRACTURE AND STRAIN PHENOMENA

Co-Chairmen

Austen Smith & H. P. Croft

Discontinuous Crack Propagation—Further Studies, by L. D. Jaffe, E. L. Reed and H. C. Mann, Watertown Arsenal Laboratories.

Stress and Strain States in Elliptical Bulges, by C. C. Chow, A. W. Dana and G. Sachs, Case Institute of Technology.

(Continued on next page)

(*Continued from page* 15)

The Comparative Creep Properties of Several Types of Commercial Coppers, by A. D. Schwope, K. F. Smith and L. R. Jackson, Battelle Memorial Institute.

The Active Slip Systems in the Simple Axial Extension of a Single Crystalline Alpha Brass, by R. C. Maddin, C. H. Mathewson and W. R. Hibbard, Jr., Yale University.

2:00 p. m.—Allerton Hotel

ELECTRICAL PROPERTIES OF ALLOYS

Co-Chairmen

W. C. Ellis & A. Jones

P-Type and N-Type Silicon and the Formation of the Photovoltaic Barrier in Silicon Ingots, by J. H. Scaff, H. C. Theurer and E. E. Schumacher, Bell Telephone Laboratories.

Microstructure of Silicon Ingots, by W. G. Pfann and J. H. Scaff, Bell Telephone Laboratories.

Electrical Properties of the Intermetallic Compounds Mg_2Sn and Mg_2Pb, by W. D. Robertson, University of Chicago, and H. H. Uhlig, Massachusetts Institute of Technology.

Ferromagnetic Alloys in the Systems Copper-Manganese-Indium and Copper-Manganese-Gallium, by F. A. Hames and D. S. Eppelsheimer, Missouri School of Mines and Metallurgy.

Tuesday, Oct. 18

9:00 a. m.—Allerton Hotel

TRANSFORMATIONS

Co-Chairmen

A. R. Troiano and G. M. Cover

Kinetics of Austenite Decomposition —Ferrite Nucleated Products, by J. C. Fisher, J. H. Hollomon and D. Turnbull, General Electric Co.

Free Energy Changes Accompanying the Martensite Transformation in Steels, by J. C. Fisher, General Electric Co.

The Hardenability Effect of Molybdenum, by J. M. Hodge, J. L. Giove and R. G. Storm, Carnegie-Illinois Steel Corp.

9:00 a. m.—Allerton Hotel

FRACTURE AND STRAIN PHENOMENA

Co-Chairmen

E. H. Hollingsworth & John Dorn

Simultaneous Aging and Deformation in Metals, by J. D. Lubahn, General Electric Co.

The Transverse Bending of Single Crystals of Aluminum, by M. K. Yen, New York University, and W. R. Hibbard, Jr., Yale University.

Stages in the Deformation of Monel as Shown by Polarized Light, by D. H. Woodard, National Bureau of Standards.

Influence of Temperature on the Stress-Strain Energy Relationship for Copper and Nickel-Copper Alloys, by D. J. McAdam, Jr., National Bureau of Standards.

9:00 a. m.—Allerton Hotel

SURFACE ORIENTATION PHASE RELATIONSHIPS

Co-Chairmen

W. L. Fink & M. B. Bever

Surface Orientation and Rolling of Magnesium Sheets, by R. L. Dietrich, Dow Chemical Co.

Oriented Arrangements of Thin Aluminum Films on Ionic Substrates, by Thor Rhodin, Jr., University of Chicago.

Kinetics of the Reactions of Zirconium with O_2 N_2 ad H_2, by E. A. Gulbransen and K. Andrew, Westinghouse Research Laboratory.

Kinetics of the Reactions of Titanium with O_2, N_2 and H_2, by E. A. Gulbransen and K. Andrew, Westinghouse Research Laboratory.

2:00 p. m.—Allerton Hotel

TRANSFORMATIONS

Co-Chairmen

J. H. Hollomon & G. Edmunds

Stable Transformation Nuclei in Solids, by J. N. Hobstetter, Harvard University.

The Transformation in B-CuAl Alloys, by E. P. Klier, Pennsylvania State College and S. M. Grymko, Battelle Memorial Institute.

Transformation of Gamma Manganese to Alpha Manganese, by E. V. Potter, H. C. Lukens and R. W. Huber, U. S. Bureau of Mines.

2:00 p. m.—Allerton Hotel

STRUCTURE AND IDENTITY OF MATERIALS

Co-Chairmen

R. M. Brick & R. L. Rickett

The Rapid Determination of Orientation of Cubic Crystals, by C. G. Dunn and W. W. Martin, General Electric Co.

The Crystal Structure of Ni_4W, by E. Epremian and D. Harker, General Electric Co.

Structure of Diborides of Titanium, Zirconium, Columbium, Tantalum and Vanadium, by J. T. Norton, Massachusetts Institute of Technology, H. Blumenthal and S. J. Sideband, American Electro Metal Corp.

Isolation of Carbides From High Speed Steels, by D. J. Blickwede and M. Cohen, Massachusetts Institute of Technology.

2:00 p. m.—Allerton Hotel

DIFFUSION GRAIN BOUNDARIES

Co-Chairmen

R. Smoluchowski and J. B. Hess

The Diffusion and Solubility of Carbon in Alpha Iron, by J. K. Stanley, Westinghouse Electric Corp.

Analysis of Interstitial Diffusion Using Activity Methods, by A. G. Guy, North Carolina State College.

The Study of Grain Boundaries With the Electron Microscope, by J. F. Radavish, Purdue University.

Studies of Interface Energies in Some Aluminum and Copper Alloys, by K. K. Ikeuye and C. S. Smith, University of Chicago.

Tuesday, Oct. 18

6:00 p. m.—Chester Room

COCKTAIL PARTY

Ballroom, Allerton Hotel

ANNUAL FALL DINNER
INSTITUTE OF METALS DIVISION

Wednesday, Oct. 19

2:00 p. m.—Allerton Hotel

ANNEALING TWINS
KINK BANDS

Co-Chairmen

E. W. Palmer & G. P. Halliwell

The Origin of Annealing Twins in Brass, by R. C. Maddin, C. H. Mathewson and W. R. Hibbard, Jr., Yale University.

Annealing Twins in Copper and 70-30 Alpha Brass, by W. R. Hibbard, Jr., Jon Chao Liu and S. F. Reiter, Yale University.

Structure and Nature of Kink Bands in Zinc, by J. B. Hess and C. S. Barrett, University of Chicago.

The Vapor Pressure of Zinc and Cadmium Over Some of Their Silver Alloys, by C. E. Birchenall and C. H. Cheng, Carnegie Institute of Technology.

2:00 p. m.—Allerton Hotel

POWDER METALLURGY

A Method of Examination of Sections of Fine Metal Powder Particles With the Electron Microscope, by Laurence Delisle (Miss), Sylvania Electric Products, Inc.

The Pore Size of Hydrogen-Reduced Tungsten Powder, by Bernard Kopelman and C. C. Gregg, Sylvania Electric Products, Inc.

Determination of Boundary Stresses During the Compression of Cylindrical Powder Compacts, by M. E. Shank and John Wulff, Massachusetts Institute of Technology.

A Dilatometric Study of the Sintering of Metal Powder Compacts, by Pol Duwez and Howard Martens, California Institute of Technology.

Electrical Resistivity Measurements on Iron-Silicon Compacts Prepared by the Powder Metallurgy Procedure, by F. W. Glaser, American Electro Metal Corp.

2:00 p. m.—Allerton Hotel

TITANIUM—BERYLLIUM

Co-Chairmen

B. W. Gonser & W. L. Worth, Jr.

The Lattice Parameters of High-Purity Alpha Titanium and the Effect of Oxygen and Nitrogen on Them, by H. T. Clark, Jr., Remington Arms Co., Inc.

The Effect of Oxygen, Nitrogen and Hydrogen on Iodide Refined Titanium, by R. I. Jaffee and I. E. Campbell, Battelle Memorial Institute.

Preparation and Casting of Beryllium Melts, by J. K. Kura, J. A. Jackson, M. C. Udy and L. W. Eastwood, Battelle Memorial Institute.

Metallographic Examination of Beryllium Alloys, by M. C. Udy, G. K. Manning and L. W. Eastwood, Battelle Memorial Institute.

American Welding Society

Thirtieth Annual Meeting
For Economy in Production—Weld!
Headquarters at Cleveland Hotel, Oct. 17-21

Sunday, Oct. 16, 3:00 p. m.

REGISTRATION AND GET-TOGETHER

Monday, Oct. 17

9:30 a. m.—Ballroom
Cleveland Hotel

STRUCTURAL DESIGN

Chairman—LaMotte Grover
Co-Chairman—F. L. Plummer

Design and Construction of a Modern Welded Deck Girder Highway Bridge, by Ned L. Ashton, State University of Iowa.

Economical Design of Welded Buildings, by Robert E. Robertson, Jr., Saxe, Williar & Robertson, engineers and consultants.

Proposed Design of Welded Rigid Frames for New York Subways, by Martin P. Korn, consulting engineer.

A Strain Gage Test and Analysis of an Eighty-Foot H-Section Welded Truss, by A. Waidelich, Austin Co.

9:30 a. m.—Red Room

PRESSURE VESSELS

Chairman—A. C. Weigel
Co-Chairman—G. M. Trefts

Importance of Design in Construction of Tanks and Pressure Vessels, by Walter Samans, chairman, Pressure Vessel Research Committee.

Trends in Fabrication by Welding, by S. V. Williams, Struthers-Wells Corp.

Inert-Gas-Shielded-Arc Welding Aluminum Pressure Vessels, by A. J. Hopper, Welding Engineers, Inc.

Notch Sensitivity of Mild Steel Plates, by A. B. Bagsar, Sun Oil Co.

9:30 a. m.—Rose Room

HARD FACING AND FLAME HARDENING

Chairman—R. P. Tarbell
Co-Chairman—G. H. Meyer

Automatic Electric Hard Facing, by Turner G. Brashear, Jr., Leader Welding & Mfg. Co.

Hot Hardness of Hard Facing Alloys, by Howard S. Avery, American Brake Shoe Co.

Hard Facing Applications in the Steel Industry, by J. J. Barry, Air Reduction Sales Co.

Flame Hardening of Large Diameter Rounds, by S. Smith, Air Reduction Sales Co.

2:00 p. m.—Red Room

NONFERROUS METALS

Chairman—O. B. J. Fraser
Co-Chairman—F. G. Flocke

Arc Welding of Molybdenum, by I. S. Goodman, Westinghouse Electric Corp.

The Welding of High-Nickel Alloys to Other Metals, by G. R. Pease and H. B. Bott, International Nickel Co., Inc.

Seam Welding Monel Metal to Steel, by Ernest F. Nippes, Allan R. Pfluger and Gerald M. Slaughter, Rensselaer Polytechnic Institute.

2:00 p. m.—Rose Room

EDUCATION

Chairman—R. A. Wyant
Co-Chairman—Gilbert Doan

Welding in Engineering Education, by R. S. Green, Ohio State University.

Formal Training of Welding Personnel, by Allen C. Tyler, acting dean, LeTourneau Technical Institute.

Continuation of Study of Welding and Welding Processes, by Frank W. Scott, Marquette Mfg. Co., Inc.

2:00 p. m.—Ballroom

RESEARCH

Chairman—Ross J. Yarrow
Co-Chairman—L. K. Stringham

The Statistical Part in Welding Investigations, by B. B. Day, statistician, director's staff, U. S. Naval Engineering Experiment Station.

Brittle Failure and Size Effect in a Mild Steel, by K. J. Stodden and E. P. Klier, Pennsylvania State College.

Weld-Peening Investigations, by J. Lyell Wilson, American Bureau of Shipping.

8:00 p. m.—Ballroom

AWARDS OF PRIZES AND MEDALS

1949 ADAMS LECTURE

Chairman—George N. Sieger
Co-Chairman—M. S. Shane

The Advantages and Disadvantages of Electric Welding as a Means of Fabricating Steel Structures, by W. M. Wilson, University of Illinois.

EDUCATIONAL LECTURE SERIES ON DESIGNING FOR WELDING

Mon., Tues. and Wed., Oct. 17, 18, 19—4:30 to 6:00 p. m.
Clubroom B, Third Floor, Public Auditorium

Chairman—G. E. Doan
Lehigh University

Lecturer—H. W. Pierce
New York Shipbuilding Corp.

Tuesday, Oct. 18

9:30 a. m.—Ballroom

SYMPOSIUM ON SHIP STRUCTURE RESEARCH

Chairman—Capt. C. M. Tooke
Co-Chairman—Comdr. R. D. Schmidtman

Introduction—the Work of the Ship Structure Committee, by Rear Admiral Ellis Reedhill, U.S.C.G., Chairman, Ship Structure Committee.

Factors Influencing the Tensile Behavior of Notched Flat Plate Specimens, by S. T. Carpenter and Capt. W. P. Roop, U.S.N. (Ret.), Swarthmore College.

Correlation of Test Results, by C. F. Tipper, Cambridge University, England.

Tests of Slotted Steel Plates, by E. M. MacCutcheon, C. L. Pittiglio, David Taylor Model Basin, U.S.N., and R. H. Raring, National Research Council.

Further Study of the Navy Tear Test, by Noah Kahn and Emil Imbembo, New York Naval Shipyard.

9:30 a. m.—Red Room

RESISTANCE WELDING

Chairman—T. Embury Jones
Co-Chairman—R. E. Powell

Material Consumption Rates and Flashing Characteristics, by William N. Platte, Westinghouse Electric Corp.

Factors Affecting the Quality of Production Flash Welding, by E. Sirabian, Arnold, Schwinn & Co.

The Homopolar Generator Stored-Energy System for Resistance Welding, by Thomas J. Crawford, Progressive Welder Co.

Circuit Analysis of Frequency Changer Welders, by W. K. Boice, General Electric Co.

9:30 a. m.—Rose Room

MACHINERY WELDING

Chairman—Charles H. Jennings
Co-Chairman—L. S. McPhee

Weldment Design and Engineering Practice, by Anthony K. Pandjiris, Pandjiris Weldment Co.

Welding of Alloy Steel Shovel Buckets, by E. R. McClung, Lukenweld, Inc.

Lowering Cost of Welded Construction, by Omer Blodgett, Lincoln Electric Co.

Aluminum Bronze Electrodes, by J. A. Cunningham, J. A. Cunningham Equipment, Inc.

(Continued on next page)

Tuesday, Oct.18

2:00 p. m.—Ballroom
Cleveland Hotel
SYMPOSIUM ON
SHIP STRUCTURE RESEARCH
Chairman—Finn Jonassen
Co-Chairman—J. Lyell Wilson

Distribution of Relative Ductility in Steel Weldments, by L. J. Klingler and L. J. Ebert, Case Institute of Technology.

Bend and Tensile Specimens Used as Indices of Performance and Weldability, by C. B. Voldrich and P. J. Rieppel, Battelle Memorial Institute.

Effect of Cyclic Stress on Impact Transition Curve of Ship Steels, by J. M. Lessells and H. E. Jacques, Massachusetts Institute of Technology.

Axial Tension Impact Tests of Structural Steels, by W. H. Bruckner and N. M. Newmark, University of Illinois.

2:00 p. m.—Red Room
RESISTANCE WELDING
Chairman—R. H. Aborn
Co-Chairman—R. T. Gillette

Spot Weld Consistency Studies, by Julius Heuschkel, Westinghouse Research Labs.

Spot Welding Heavy Gage Structural Steel, by Ernest F. Nippes and R. F. Underhill, Jr., Rensselaer Polytechnic Institute.

Slope Control and Its Effect on Spot and Projection Welding, by I. W. Johnson, General Electric Co.

2:00 p. m.—Rose Room
MISCELLANEOUS
Chairman—L. C. Bibber
Co-Chairman—J. J. Chyle

Welding of Zinc-Base Die Castings, by Roland H. Ogden, Alladin Rod & Flux Mfg. Co.

Silver Alloy Brazing Stainless Steel, by C. H. Chatfield and A. W. Swift, Handy & Harman.

Magnaflux Inspection of Welded Storage Tanks, by F. A. Upson, Standard Oil Co. (Indiana).

High Energy Loading Method of Testing Steel Plate and Weldments, by G. S. Mikhalapov, Metallurgical Research and Development Co., Inc.

8:00 p. m.—Red Room
PRESIDENT'S RECEPTION

Wednesday, Oct. 19

9:30 a. m.—Red Room
APPARATUS
Chairman—H. O. Hill
Co-Chairman—A. M. Setapen

Design Features of a Welding Generator With Controlled Reactance, by J. M. Tyrner, Air Reduction Sales Co., and O. Kobel, G. D. Peters & Co. of Canada, Ltd.

Measurement of Flux Densities in Steels for Magnetic Particle Inspection, by T. E. Hamill, Naval Gun Factory.

Economical Arc Welding, by S. Oestreicher, Harnischfeger Corp.

9:30 a. m.—Ballroom
RESISTANCE WELDING
Chairman—Wilson Scott
Co-Chairman—B. L. Wise

Fatigue Tests of Spot Welded Mild Steel and Stainless Steel Sheets, by Georges Welter, Ecole Polytechnique, Montreal, Canada.

Spot Welding Galvanized Steel, by M. L. Begeman, Millard L. Hipple and L. Cullum, Jr., University of Texas.

Electrical Resistance Offered by Non-uniform Current Flow, by W. B. Kouwenhoven, and William T. Sackett, Jr., School of Engineering, Johns Hopkins University.

Design and Application of Portable Resistance Welding Tools, by C. H. Davis, Jr., Budd Co.

9:30 a. m.—Rose Room
ALUMINUM
Chairman—G. O. Hoglund
Co-Chairman—Dana W. Smith

The Economy of Shielded-Arc Welding of Aluminum, by Fritz Albrecht, Glenn L. Martin Co.

Shear Strength Consistency of Spot Welds in Alclad 24 S-T3, by J. C. Barrett, Glenn L. Martin Co.

Heliarc Welding of Aluminum Alloys, by F. H. Stevenson, Modern Metal Spinning & Mfg. Co.

2:00 p. m.—BUSINESS MEETING
BOARD OF DIRECTORS MEETING

7:30 p. m.—Hotel Cleveland
SECTION OFFICERS CONFERENCE
UNIVERSITY CONFERENCE

Thursday, Oct. 20

9:30 a. m.—Red Room
ARCS AND ELECTRODES
Chairman—J. H. Humberstone
Co-Chairman—O. T. Barnett

Arc Welding Metal Transfer Analyzer, by R. C. McMaster, D. C. Martin and A. Leatherman, Battelle Memorial Institute.

Heat Effects in Anode Spots of High-Current Arcs, by T. Benjamin Jones, Johns Hopkins University.

Application of Mild Steel Welding Electrodes, by F. R. Strate, Air Reduction Sales Co., and R. I. Strough, Arcrods Corp.

Energy Distribution in Electric Welding, by Clarence E. Jackson and A. E. Shrubsall, Union Carbide and Carbon Research Laboratories.

9:30 a. m.—Rose Room
RAILROAD
Chairman—Roy F. Johnson
Co-Chairman—A. G. Oehler

Evolution of the Welded Freight Car, by L. E. Grant, Chicago, Milwaukee, St. Paul & Pacific Railroad Co.

Oxy-Acetylene Pressure-Welded Rail Saves Maintenance Costs, by L. Adams, Oxweld Railroad Service Co.

Arc Welding in Railroad Shops, by E. DiLiberti, Air Reduction Sales Co.

Inert-Gas Welding in Railroad Repair and Rehabilitation, by H. E. Gannett, Chicago, Burlington & Quincy Railroad.

9:30 a. m.—Ballroom
WELDABILITY
Chairman—A. B. Kinzel
Co-Chairman—R. E. Somers

Strain Aging in Welding Low-Carbon Structural Steel, by W. H. Bruckner and S. W. Sandberg, University of Illinois.

The High-Frequency Notch Bend Test, by Bela Ronay, U. S. Naval Engineering Experiment Station.

Studies Concerning the Strain-Aging of Arc Welds in Mild Steel, by A. E. Flanigan, University of California, Los Angeles.

Synthetically Heat Treated Specimens for Weldability, by Ernest F. Nippes and Warren Savage, Rensselaer Polytechnic Institute.

7:30 p. m.—Clubroom B
Public Auditorium
IMPORTANCE OF WELDING TO MANAGEMENT, THE ENGINEER AND THE PUBLIC

Friday, Oct. 21

9:30 a. m.—Ballroom
INERT-GAS WELDING
Chairman—C. B. Voldrich
Co-Chairman—C. A. Loomis

Heliarc Welding in the Automotive Industry, by F. J. Pilia and R. H. Bennewitz, Linde Air Products Co.

Aircomatic Welding, by A. Muller, G. J. Gibson and E. H. Roper, Air Reduction Sales Co.

Inert-Gas-Shielded Metal-Arc Welding Process, by H. O. Jones, Air Reduction Sales Co.

Applications for Helium in Inert-Arc Welding, by M. J. Conway, General Electric Co.

9:30 a. m.—Red Room
STAINLESS STEEL
Chairman—W. O. Binder
Co-Chairman—E. Vom Steeg

Corrosion Resistance of Molybdenum-Bearing Stainless Steel Weld Metals, by R. D. Thomas, Jr., and Anton L. Schaeffler, Arcos Corp.

Problems Associated With the Welding of Stainless Clad Steel, by Perry C. Arnold, Chicago Bridge and Iron Co.

Resistance Welding of Stainless Steel Truck-Trailer Body Components, by Byron Gates, Budd Co.

Stainless Steel Fabrication by Inert-Gas-Shielded Arc Welding, by Charles D. Bonifield, Globe Co.

9:30 a. m.—Rose Room
GAS CUTTING
Chairman—J. J. Crowe
Co-Chairman—H. E. Rockefeller

New Developments in Oxy-Acetylene Cutting Machines, by W. Begerow and A. H. Yoch, Air Reduction Sales Co.

Steel Warehouse Shape Cutting With Electronic Tracers, by William O. Springer, Joseph T. Ryerson & Son.

Flame Cutting, by James T. Lewis, Lewis Welding & Engineering Corp.

Powder Cutting and Scarfing Process, by C. W. Powell, Republic Steel Corp.

Exhibitors in National Metal Show

Public Auditorium, Cleveland

Oct. 17, 18 and 19, Noon to 10:30 p. m.

Oct. 20 and 21, 10:00 a. m. to 6:00 p. m.

A

Acme Mfg. Co., Detroit. Booth 826. Grinding, polishing, buffing and deburring machines.

Acme Steel Co., Chicago 8. Booth 1836. Acme-Morrison metal stitchers.

Acme Tool Co., New York 7. Booth 1758. Surface plates; parallels; straightedges; toolholders.

Air-Flo Compressor Co., Akron 7, Ohio. Booth 1750. Air compressors.

Air Force. Booth 2715. (See National Military Establishment.)

Air Reduction Sales Co., New York 17. Booth 2126. Gas welding and cutting equipment.

Ajax Electric Co., Philadelphia 23. Booth 1901. Salt bath heat treating and aluminizing furnaces.

Ajax Electrothermic Corp., Trenton 5, N. J. Booth 1901. Induction heating and melting equipment.

Ajax Engineering Corp., Trenton 7, N. J. Booth 1901. Induction melting furnaces.

Allen Manufacturing Co., Hartford 5, Conn. Booth 1615. Hollow set, cap, flat head and shoulder screws; dowel pins; pipe plugs.

Allis-Chalmers Mfg. Co., Milwaukee. Booth 1215. Foundry equipment; electronic induction heating equipment; pumps; electrical control apparatus.

Allison Co., Bridgeport 8, Conn. Booth 2008. Abrasive cutting wheels.

Alloy Casting Co. Div. Booth 210. (See Alloy Engineering and Casting Co.)

Alloy Engineering and Casting Co., Champaign, Ill. Booth 210. Heat resistant castings; engine, pump and furnace parts.

Aluminum Co. of America, Pittsburgh. Booth 2627. Aluminum in raw and fabricated forms.

American Brake Shoe Co., New York 17. Booth 325. Heat and corrosion resistant castings; cast iron; steel forgings.

American Brass Co., Waterbury 88, Conn. Booth 331. Copper alloy sheet, wire, rod, tubing and other shapes; welding rods.

American Chain & Cable Co., Inc. Bridgeport 2, Conn. Booth 925. (See Campbell Machine Division and Wilson Mechanical Instrument Co.)

American Cyanamid Co., New York 20. Booth 1704. Salt bath heat treating supplies.

American Emblem Co., Utica 1, N. Y. Booth 1809. Nameplates, insignia, emblems, embossed metal stampings.

American Forge Div., Chicago. Booth 325. (See American Brake Shoe Co.)

American Gas Association, New York 17. Booth 2844. Industrial gas applications.

American Gas Furnace Co., Elizabeth, N. J. Booth 2745. Heat treating furnaces; gas burners.

American Machine & Metals, Inc., East Moline, Ill. Booth 1709. (See Riehle Testing Machine Division.)

American Machinist. Booth 1428. (See McGraw-Hill Publishing Co., Inc.)

American Manganese Steel Div., Chicago Heights, Ill. Booth 325. Hard surfacing and reclamation welding products.

American Metal Market, New York 7. Booth 1118. Copies of *American Metal Market.*

American Non-Gran Bronze Co., Berwyn, Pa. Booth 2819. Precision machined aircraft engine and propeller parts; bronze castings; Ni-Resist, cast iron and beryllium machined parts.

American Optical Co., Buffalo 15, N. Y. Booth 1617. Scientific instruments; microscopes; comparators.

American Platinum Works, Newark 5, N. J. Booth 2242. Silver brazing alloys and fluxes.

American Pullmax Co., Inc., Chicago 47. Booth 2521. Sheet metal and plate cutting machinery.

American Society for Metals, Cleveland 3. Booth 2759. Technical books and magazines; educational services.

American Wheelabrator & Equipment Co., Mishawaka, Ind. Booth 2016. Blast cleaning machines; shotpeening equipment; dust collectors.

Ames Precision Machine Works, Waltham, Mass. Booth 2817. Hardness testers.

AVOID DELAY AT THE REGISTRATION DESK

See page 61 for Metal Show Advance Registration Coupon

Ampco Metal, Inc., Milwaukee 4. Booth 315. Aluminum bronze sand and centrifugal castings; welding electrodes; spot welding electrodes and parts; high-conductivity alloys; safety tools.

Anchor Drawn Steel Co. Booth 1401. (See Vanadium-Alloys Steel Co.)

Anker-Holth Mfg. Co., Port Huron, Mich. Booth 2650. Air chucks; collets; air and hydraulic equipment.

Applied Hydraulics. Booth 1621. (See Industrial Publishing Co.)

Arcos Corp., Philadelphia 43. Booth 1125. Arc welding electrodes; oxy-arc cutting process.

Army, Department of. Booth 2715. (See National Military Establishment.)

Aronson Machine Co., Arcade, N. Y. Booth 2560. Positioners for welding, spray painting, sandblasting, assembly work and grinding, belt sanders.

Arwood Precision Casting Corp., Brooklyn 1. Booth 2411. Precision investment castings, ferrous and nonferrous.

Aurora Metal Co., Aurora, Ill. Booth 1620. Die castings.

Austenal Laboratories, Inc., New York 16. Booth 931. Microcastings made in high-temperature alloys, low alloys, S.A.E. steels and toolsteels.

Auto Arc-Weld Mfg. Co., Cleveland 4. Booth 2566. Automatic arc welding head and wire.

Automotive Industries. Booth 1754. (See Chilton Co.)

B

B-A Coupling Co., Inc. (See Clark Sales Corp.)

Baker & Co., Inc., Newark 5, N. J. Booth 2419. Industrial and laboratory furnaces; purifiers and dryers.

Baldwin Locomotive Works, Eddystone, Pa. Booth 1033. Universal testing machines; tensile, fatigue and impact machines; SR-4 load cell; extensometers.

Bastian-Blessing Co., Chicago 30. Booth 437. Regulators, valves, manifolds, fittings for high-pressure gases.

Bath Corporation, Cyril, Cleveland. Booth 2138. Contour formers; presses; dies and tools.

Bausch & Lomb Optical Co., Rochester 2, N. Y. Booth 432. Research metallographs, metallurgical and shop microscopes.

Bishop & Co., J., Malvern, Pa. Booth 2007. Platinum and stainless steel products; small tubular specialties.

Black Drill Co., Cleveland 17. Booth 303. Drills for hardened steels.

Blakeslee & Co., G. S., Chicago 40. Booth 2236. Solvent degreasers and metal parts washers.

Braeburn Alloy Steel Corp., Braeburn, Pa. Booth 317. Toolsteels.

Bridgeport Brass Co., Bridgeport 2, Conn. Booth 825. Brass and copper alloy products; tubing; wire; shapes; welding rod.

Bruning Co., Inc., Charles, Chicago 41. Booth 2101. Printing, developing and drafting equipment.

Brush Beryllium Co., Cleveland 3. Booth 2554. Beryllium metal, alloys and products.

Brush Development Co., Cleveland. Booth 1114. Surface analyzers; strain analyzers; contour analyzers.

Buehler Ltd., Chicago 1. Booth 513. Sample preparation equipment for the metallurgical laboratory; microtesting machines; optical equipment.

Bundy Tubing Co., Detroit 14. Booth 1214. Tubing.

By-Products Steel Co. Div., Coatesville, Pa. Booth 503. (See Lukens Steel Co.)

C

Campbell Machine Div., American Chain & Cable Co. Inc., Bridgeport 2, Conn. Booth 925. Abrasive cutting machines; nibbling machines.

Carpenter Mfg. Co. (See Clark Sales Corp.)

Central Scientific Co., Chicago 13. Booth 1506. Laboratory apparatus.

Champion Rivet Co., Cleveland 5. Booth 531. Welding electrodes and holders; rivets, pins and bushings; sample weldments.

Chilton Co., Inc., New York 17. Booth 1202 and 1754. Publications (*Automotive Industries*).

Cincinnati Milling & Grinding Machines Inc., Cincinnati. Booth 1826. Flame hardening machine; machine tools.

Cities Service Oil Co., New York 5. Booth 919. Cutting and grinding oils; drawing compounds; greases.

Clark Sales Corp., Cleveland. Booth 1528. Ball, check and needle valves; couplings.

Cleco Division, Reed Roller Bit Co., Houston, Texas. Booth 2562. Air tools.

Cleveland Electric Illuminating Co., Cleveland. Booth 526. Electrical power for industry.

Cleveland Punch & Shear Works Co., Cleveland. Booth 1837. Presses, clutches and press brakes.

Climax Molybdenum Co., New York 18. Booth 338. Molybdenum and molybdenum alloys; ores.

Clinton Machine Co., Inc., Clinton, Mich. Booth 219. Electrical machine for piercing hard metals.

Coast Metals, Inc., Canton 6, Ohio. Booth 2329. Hard facing welding rod.

Colonial Steel Div. Booth 1401. (See Vanadium-Alloys Steel Co.)

Commerce Pattern Foundry & Machine Co. Booth 2015. (See Upton Electric Furnace Division.)

Commercial Shearing & Stamping Co., Youngstown 1, Ohio. Booth 1738. Pressed metal products; hydraulic hoist equipment.

Consolidated Engineering Corp., Pasadena 4, Calif. Booth 2514. Recording systems; spectrometers; computers; analyzers.

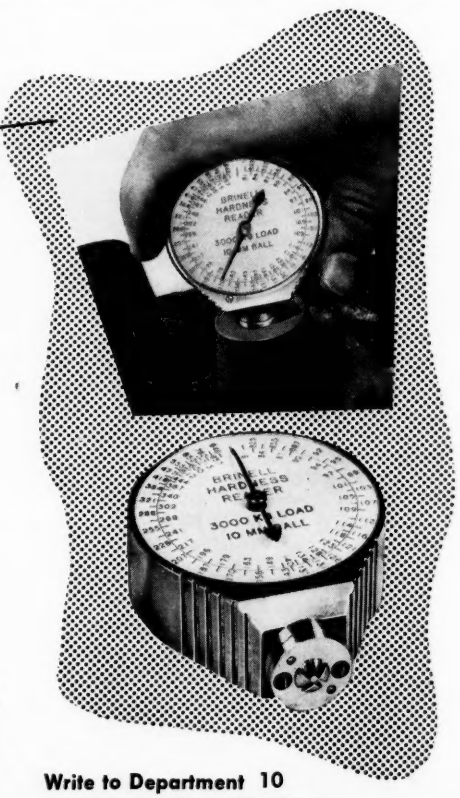
Contour Marker Corp., Compton, Calif. Booth 2531. Marking devices.

Crane Packing Co., Chicago 13. Booth 836. Metallic packings; mechanical seals.

D

Delta File Works, Inc., Philadelphia 37. Booth 1753. Hand files; rotary power files.

LOOK. . A QUICK, ACCURATE WAY TO READ BRINELL HARDNESS



All you do is press the Dietert Hardness Reader into the Brinell impression on a casting and read its hardness number on the convenient dial. This takes no skill—anyone can do it—no microscope—no conversion tables—and the results will be just as accurate as though you used all the apparatus in the laboratory.

Look at it—only pocket size and you can't break the crystal. Carry it with you for spot checks on parts that have Brinell impressions any time you are out in the shop.

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Write to Department 10 for prices and specifications

Detrex Corp., Detroit 32. Booth 1210. Cleaning and degreasing equipment; cleaning compounds and solvents.

Detroit Testing Machine Co., Detroit 13. Booth 1616. Tensile and ductility testers; Brinell machines.

Die Castings. Booth 1621. (See Industrial Publishing Co.)

Dietert Company, Harry W., Detroit 4. Booth 214. Carbon and sulphur determination equipment; Brinell reader; sand, core and mold testing equipment for the foundry.

Distillation Products, Inc., Rochester 13, N. Y. Booth 1907. Vacuum systems, gages, furnaces.

DoAll Company, Cleveland 3 and Des Plaines, Ill. Booth 1135. Sawing, filing and grinding equipment; gages; chucks; automatic selecting equipment.

Doughty Laboratories, New York. Booth 534. Steel hardening compound.

Dow Chemical Co., Midland, Mich. Booth 401. Magnesium; magnesium alloy products.

Driver Co., Wilbur B., Newark, N. J. Booth 1427. Heat and corrosion resistant alloys; wire, ribbon and strip.

E

Ecco High Frequency Corp., North Bergen, N. J. Booth 2748. High-frequency induction heating equipment.

Eclipse Fuel Engineering Co., Rockford, Ill. Booth 2847. Industrial gas burners and furnaces.

Ekstrand & Tholand, Inc., New York 17. Booth 2532. Iron powders; alloy powders.

Electric Furnace Co., Salem, Ohio. Booth 1014. Gas-fired, oil-fired and electric heat treating furnaces; controlled atmosphere equipment.

Electro Alloys Division, American Brake Shoe Co., Elyria, Ohio. Booth 325. Heat and corrosion resistant castings; furnace parts.

Elgin National Watch Co., Aurora, Ill. Booth 351. Industrial sapphire products; Elgiloy corrosion resistant alloy.

Engineered Castings Div. Booth 325. (See American Brake Shoe Co.)

Erickson Tool Div., Erickson Steel Co., Cleveland 14. Booth 808. Collet chucks and other holding tools.

Eutectic Welding Alloys Corp., New York 13. Booth 1703. Welding rods and electrodes.

F

Fawick Airflex Co., Inc., Cleveland 11. Booth 2537. Industrial clutches and seals.

Ferner Co., R. Y., Boston 48. Booth 548. Scientific instruments; laboratory equipment.

Ferrotherm Corp., Cleveland 3. Booth 2632. Metal assemblies and springs.

Flow. Booth 1621. (See Industrial Publishing Co.)

Foote Mineral Co., Philadelphia 44. Booth 2132. Chemicals and minerals; powder metals and alloys; zirconium.

Forest City Foundries Co., Cleveland. Booth 1108. Gray iron and semisteel castings for agricultural, automotive, electrical and light machinery industries.

Foster Transformer Co., Cincinnati 23. Booth 1025. Welding transformers.

Foundry. Booth 1419. (See Penton Publishing Co.)

Fulton Foundry & Machine Co., Inc., Cleveland 4. Booth 811. Meehanite irons.

G

Gardner Publications, Inc., Cincinnati 2. Booth 2456. Publications.

Gas Appliance Service, Inc., Chicago 14. Booth 2739. High-speed heating units; gas-air mixers; burners; air heaters.

Gas Machinery Co., Cleveland 10. Booth 2835. Heat treating equipment; gas producers.

General Alloys Co., Boston 27. Booth 441. Heat and corrosion resistant castings and furnace parts.

General Aniline & Film Corp., Johnson City, N. Y. Booth 2427. See Ozalid Div.

General Electric Co., Schenectady 5. Booth 2108. Testing and inspection equipment; welding equipment; furnaces.

Globe Stamping Div. Hupp Motor Car Corp., Cleveland 2. Booth 907. Tumbling barrels; stamped metal parts; machined parts.

Goodrich Co., B. F., Akron, Ohio. Booth 1916. Rivnut blind fasteners.

Gordon Co. of Ohio, Claud S., Cleveland 14. Booth 2744. Temperature control equipment; furnaces.

Gray Iron Founders' Society, Inc., Cleveland 14. Booth 2859. Developments in the gray iron field.

Gulf Oil Corp., Pittsburgh 30. Booth 837. Petroleum products—lubricants, cutting and quenching oils.

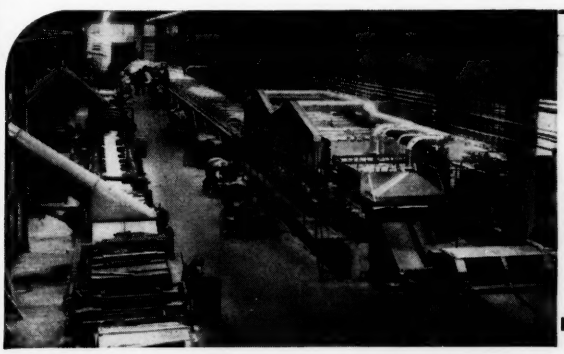
H

H & H Research Co., Detroit 10. Booth 1758. Reciprocating action tools and accessories; surface plates, toolholders.

HPL Manufacturing Co., Cleveland 3. Booth 1825. Metal stampings.

Hamilton Manufacturing Co., Two Rivers, Wis. Booth 2141. Drafting-room equipment.

Hammond Machinery Builders, Inc., Kalamazoo 54F, Mich. Booth 1142. Polishing, buffing and grinding equipment.



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Handy & Harman, New York 7. Booth 337. Brazing equipment.

Harnischfeger Corp., Milwaukee 14. Booth 1806. Arc welders; positioners; handling equipment.

Harper Electric Furnace Corp., Niagara Falls, N. Y. Booth 1106. High-temperature electric furnaces.

Harshaw Chemical Co., Cleveland. Booth 1532. Plating and finishing supplies; chemicals.

Harvey Machine Co., Inc., Torrance, Calif. Booth 2220. Aluminum extrusions; special shapes.

Haskell Mfg. Co., Inc., Pittsburgh 21. Booth 2802. Drafting desks.

Hauck Manufacturing Co., Brooklyn 15. Booth 2703. Oil burners; valves.

Hayes, Inc., C. I., Providence 5, R. I. Booth 1842. Electric furnaces for heat treating and brazing.

Haynes-Stellite Co., Kokomo, Ind. Booth 1926. High-temperature and corrosion resistant alloys; precision castings; hard facing rods and tools.

Heil Process Equipment Corp., Cleveland 11. Booth 2628. Process tanks; chemical apparatus; chemical-proof construction.

Heppenstall Co., Pittsburgh 1. Booth 1115. Forgings; shear knives; die blocks.

Hevi Duty Electric Co., Milwaukee 1. Booth 509. Electric industrial and laboratory furnaces.

Hobart Brothers Co., Troy, Ohio. Booth 2544. Electric arc welding equipment.

Holcroft & Co., Chicago 3 and Detroit 10. Booth 2614. Heat treating equipment and supplies.

Hones, Inc., Charles A., Baldwin, L. I., N. Y. Booth 2848. Gas-fired oven furnaces; burners.

Houghton & Co., E. F., Philadelphia 33. Booth 939. Cutting oils; heat treating compounds; metal cleaners.

Hupp Corp. Booth 907. (See Globe Stamping Machine Division.)

I

Illinois Testing Laboratories, Inc., Chicago. Booth 935. Temperature, air and dew point measuring instruments.

Industrial Heating. Booth 1746. (See National Industrial Publishing Co.)

Industrial Press, New York 13. Booth 202. Trade papers and engineering data.

Industrial Publishing Co., Cleveland 13. Booth 1621. Magazines and publications.

Industry and Welding. Booth 1621. (See Industrial Publishing Co.)

Instant Tool Corp., Binghamton, N. Y. Booth 2869. Soldering irons.

Institute of Industrial Launderers, Inc., Cleveland 4, and New York 17. Booth 1757. Industrial wiping towels and garments.

International Nickel Co., Inc., New York 5. Booth 302. Nickel and nickel alloys; nickel steel and cast iron; stainless steels.

Invincible Vacuum Cleaner Mfg. Co., Dover, Ohio. Booth 2520. Welding flux recovery equipment.

Ipsen Industries, Inc., Rockford, Ill. Booth 2645, Heat treating specialists.

Iron Age, New York 17. Booth 1202. Publications; reprints; technical manuals.

J

Jackson Products, Warren, Mich. Booth 2660. Electrode holders and arc welding accessories.

Janney Cylinder Co., Philadelphia 36. Booth 2316. Finish-machined products made from centrifugal castings of ferrous and nonferrous alloys.

Jarrell-Ash Co., Boston 16. Booth 1228. Precision scientific apparatus.

Jensen Specialties, Inc., Detroit 28. Booth 2325. Infrared ovens.

K

Kelley Co., J. W., Cleveland 11. Booth 1601. Industrial oils; heat treating products.

Kemp Mfg. Co., C. M., Baltimore 2, Md. Booth 2834. Burners; heating units; control equipment.

Kennametal, Inc., Latrobe, Pa. Booth 520. Tools with brazed-on, screwed-on and clamped-on tips; solid carbide tools; wear resistant parts.

Kent Co., Inc., Rome, N. Y. Booth 2644. Floor machines and suction cleaners.

King, Andrew, Narberth, Pa. Booth 244. Portable Brinell hardness tester; folding Brinell microscope.

Knapp Mills, Inc., New York 4. Booth 1708. Chemical and process equipment. Lead-lined products.

Krouse Testing Machine Co., Columbus 3, Ohio. Booth 1514. Rotating beam machines; universal spring fatigue machine; creep rack.

Kux Machine Co., Chicago 24. Booth 1020. Die casting machines; powder metal press.

L

Laboratory Equipment Corp., St. Joseph, Mich. Booth 2773. Metallurgical laboratory equipment.

Lake City Malleable Co., Cleveland. Booth 2338. Malleable castings.

Lakeside Steel Improvement Co., Cleveland 14. Booth 232. Commercial heat treating.

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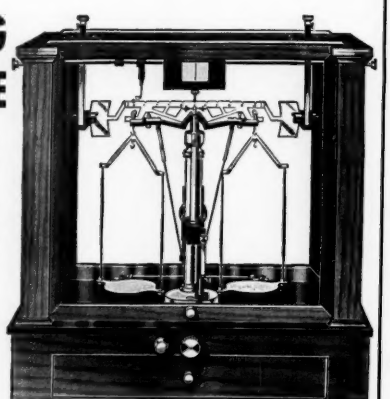

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Leeds & Northrup Co., Philadelphia 44. Booth 1409. Temperature recorders and controllers; heat treating furnaces.

Lepel High Frequency Laboratories, Inc., New York City. Booth 2102. High frequency induction heating equipment.

Leslie Welding Co., Chicago 12. Booth 1619. Large hand punch presses; ventilators; welding to order.

Lewis Machine Co., Cleveland 4. Booth 831. Wire straightening and cutting machinery.

L'Hommedieu & Sons Co., Chas. F., Chicago 23. Booth 2120. Polishing, buffing and plating equipment.

Lincoln Electric Co., Cleveland 1. Booth 410. Arc welding equipment and supplies.

Lindberg Engineering Co., Chicago 12. Booth 1509. Heat treating furnaces and equipment.

Linde Air Products Co., New York 17. Booth 1926. Gas welding and cutting equipment and supplies; Unionmelt; Heliarc.

Lipe-Rollway Corp., Syracuse 1, N. Y. Booth 1109. Power hacksaw machine.

Liquid Carbonic Corp., Chicago 23. Booth 1116. Gas welding and cutting equipment.

Lithium Co., Newark 4, N. J. Booth 2749. Lithium atmosphere heat treating and forging furnaces.

Lukens Steel Co., Coatesville, Pa. Booth 503. Steel plate; clad steels.

Lukenweld Division, Lukens Steel Co., Coatesville, Pa. Booth 503. Nickel-clad, monel-clad and inconel-clad steels.

M

Machine Design. Booth 1419. (See Penton Publishing Co.)

Machinery. Booth 202. (See Industrial Press.)

Magnaflux Corp., Chicago 31. Booth 1015. Magnetic flaw detection equipment; thickness gage.

Magnetic Analysis Corp., Long Island City 1, N. Y. Booth 1119. Magnetic inspection equipment; comparators.

Magnetrode Corp., Kansas City, Mo. Booth 2825. Welding.

Malleable Founders Society, Cleveland. Booth 2041. Malleable iron information and applications.

Manhattan Rubber Division, Raybestos-Manhattan, Inc., Passaic, N. J. Booth 2320. Abrasive disks; grinding and cutting wheels.

Martindale Electric Co., Cleveland 7. Booth 2656. Grinding and filing equipment; saws; dust masks.

Master Builders Company, Cleveland 3. Booth 1765. Concrete and masonry; industrial floors; grouting cement.

Materials & Methods, New York 18. Booth 1605. Publications.

May-Fran Engineering Inc., Cleveland 12. Booth 1130. Materials handling equipment.

McGraw-Hill Publishing Co., Inc., New York 18. Booth 1428. Magazines and books.

McKay Co., York, Pa. Booth 2423. Welding electrodes.

Merrill Brothers, Maspeth, N. Y. Booth 1771. Drop forgings, shackles, eye-bolts.

Metal & Thermit Corp., New York 5. Booth 1935. Arc welding electrodes.

Metal Progress. Booth 2759. (See American Society for Metals.)

Metals Review, Booth 2759. (See American Society for Metals.)

Michiana Products Corp., Michigan City, Ind. Booth 237. Stainless, heat resistant and abrasion resistant castings.

Milburn Co., Detroit 7. Booth 2863. Protective hand creams; safety clothing.

Miller Electric Mfg. Co., Appleton, Wis. Booth 2526. Electric welders and accessories.

Miller Co., J. C., Grand Rapids 4, Mich. Booth 2341. Buffing compounds; electroplating and polishing equipment and supplies.

Milne & Co., A., New York 14. Booth 314. Steel distributors.

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Miskella Infra-Red Co., Cleveland 4. Booth 814. Infrared ovens.

Modern Machine Shop, Cincinnati 2. Booth 2456. (See Gardner Publications.)

Moto-Truc Co., Cleveland 3. Booth 2208. Motorized hand trucks.

N

National Bearing Div. Booth 325. (See American Brake Shoe Co.)

National Carbon Co., Inc., New York 17. Booth 1926. Graphite electrodes; carbon refractories and molds; heat exchangers.

National Diamond Laboratory, New York 7. Booth 2707. Industrial diamond tools.

National Industrial Publishing Co., Pittsburgh 19. Booth 1746. Publications.

National Lead Co., New York 6. Booth 2559 and 1112. Lead primary products and end products.

National Military Establishment, Washington 25, D. C. Booth 2715. Technical developments by the Armed Services.

National Radiator Co., Johnstown, Pa. Booth 1510. (See Plastic Metals Div.)

National Research Corp., Boston 15. Booth 2662. Vacuum-cast metals; high-vacuum furnaces and equipment.

National Spectrographic Labs., Inc., Cleveland 3. Booth 1228. Spectrographic equipment.

Navy, Dept. of. (See National Military Establishment.)

New Equipment Digest. Booth 1419. (See Penton Publishing Co.)

New Jersey Zinc Co., New York 7. Booth 415. Zinc die castings and finished products.

Nickel Plate Railroad, Cleveland. Booth 225. Industrial promotion.

North American Mfg. Co., Cleveland 5. Booth 1136. Gas burner systems.

North American Philips Co., Mt. Vernon, N. Y. Booth 832. Diffraction equipment and cameras; X-ray spectrometers.

O

Oakite Products, Inc., New York. Booth 2565. Cleaning compounds and materials; steam cleaning equipment.

Ohio Crankshaft Co., Cleveland 1. Booth 537. High-frequency induction heating equipment.

Ohio Seamless Tube Co., Shelby, Ohio. Booth 1032. Seamless and electric welded steel tubing.

Olsen Testing Machine Co., Tinius, Willow Grove, Pa. Booth 1830. Universal and tensile testing machines; small tools and instruments.

O'Neil-Irwin Mfg. Co., Lake City, Minn. Booth 451. Sheet metal working machinery.

Optimus Equipment Co., Matawan, N. J. Booth 1737. Washing, rinsing, pickling and drying equipment.

Osborn Manufacturing Co., Cleveland 14. Booth 817. Power and hand brushes.

Ozalid Div., General Aniline and Film Corp., Johnson City, N. Y. Booth 2427. Printing, developing and drafting equipment.

P

Pangborn Corp., Hagerstown, Md. Booth 1715. Hydro-Finish blast cleaning machine.

Park Chemical Co., Detroit 4. Booth 544. Heat treating materials.

Partlow Corp., New Hartford, N. Y. Booth 2418. Temperature controls; recorders; thermometers; valves and timers.

Penton Publishing Co., Cleveland 13. Booth 1419. Technical magazines and books.

Permanente Metals Corp., Oakland 12, Calif. Booth 1205. Applications of aluminum sheet, plate, coil and shapes.

Peters-Dalton, Inc., Detroit 12. Booth 536. Dust collectors; spray booths.

Phillips Manufacturing Co., Chicago 45. Booth 1629. Vapor degreasers.

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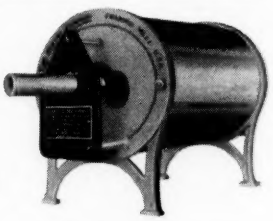

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Physicists Research Co., Ann Arbor, Mich. Booth 1420. Surface analysis equipment.

Plastic Metals Division, National Radiator Co., Johnstown, Pa. Booth 1510. Metal powders and parts.

Porter-McLeod Machine Tool Co., Inc., Hatfield, Mass. Booth 1745. Polishing and finishing machines; abrasive cut-off machines.

Precision Metalsmiths, Inc., Cleveland 3. Booth 2515. Precision castings.

Precision Shapes Inc., Suffern, N. Y. Booth 2771. Milling shapes.

Precision Tube Co., Philadelphia 28. Booth 2867. Small nonferrous metal tubing.

Precision Welder and Machine Co., Cincinnati 10. Booth 1817. Resistance welding machines.

Preston Co., Horace G., Detroit 16. Booth 1128. Packing; gaskets; valves; washers.

Product Engineering. Booth 1428. (See McGraw-Hill Publishing Co., Inc.)

Production Machine Co., Greenfield, Mass. Booth 926. Polishing, buffing and deburring machines.

Products Finishing, Cincinnati 2. Booth 2456. (See Gardner Publications, Inc.)

Pyrometer Instrument Co., Inc., Bergenfield, N. J. Booth 1626. Optical, radiation and immersion pyrometers.

Pyrometer Service & Supply Co. Booth 2744. (See Gordon, Claud S. of Ohio)

R

Ransom & Randolph Co., Toledo 1, Ohio. Booth 2568. Dental alloys and supplies.

Ransome Machinery Co., Dunellen, N. J. Booth 1019. (See Worthington Pump & Machinery Corp.)

Rapids-Standard Co., Grand Rapids, Mich. Booth 1702. Materials handling equipment; conveyers; hand trucks.

Raybestos-Manhattan, Inc., (See Manhattan Rubber Division.)

Reed Roller Bit Co. Booth 2562. (See Cleco Division)

Reeves Pulley Co., Columbus, Ind. Booth 1519. Pulleys and belts in metalworking and plant equipment.

Reinhold Publishing Corp., New York 18. Booth 1605. Copies of *Materials & Methods.*

Revere Copper & Brass, Inc., New York 17. Booth 1003. Applications of Revere metal, copper and brass, aluminum.

Reynolds Metals Co., Louisville 1, Ky. Booth 1412. Aluminum primary products and end products.

Richards Co., J. A., Kalamazoo 60F, Mich. Booth 1126. Bending and cutting machines.

Riehle Testing Machine Div., East Moline, Ill. Booth 1709. Tensile, impact, hardness and other mechanical testing machines.

Riverside Metal Co., Riverside, N. J. Booth 2231. Nickel silver; phosphor bronze; beryllium copper; cupronickel.

Rolock, Inc., Fairfield, Conn. Booth 820. Fabricated heat and corrosion resistant alloys for furnace parts; metalworking trades.

Ruemelin Mfg. Co., Milwaukee 12. Booth 2615. Sand blasting equipment.

Ryerson & Son, Inc., Joseph T., Chicago 80. Booth 411. Alloy steels.

S

Safety Clothing & Equipment Co., Cleveland 3. Booth 1515. Protective clothing and safety equipment.

St. Regis Sales Corp., Cleveland. Booth 2815. Wire tying equipment and supplies.

Salkover Metal Processing, Cincinnati 2. Booth 1520. Brazing and soldering techniques.

Sandvik Steel, Inc., New York 11. Booth 512. Quality steels.

Schrader's Son Div., A., Brooklyn 17. Booth 2335. Pneumatic machine controls.

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Scovill Manufacturing Co., Waterbury 91, Conn. Booth 1220. High speed brass rod.

Selas Corp. of America, Philadelphia. Booth 2841. Heating furnaces and burners.

Sellers Engineering Co., Chicago, Ill. Booth 2837. Gas burners and heaters.

Sentry Company, Foxboro, Mass. Booth 1131. Hardening furnace; tube combustion furnace; diamond blocks and accessories.

Shell Oil Company, Inc., New York 20. Booth 1731. Industrial lubricants; cutting oils; drawing compounds.

Socony-Vacuum Oil Co., Inc., New York 4. and Cleveland 15. Booth 2619. Cutting and grinding oils; lubricants.

South Bend Lathe Works, South Bend 22, Ind. Booth 807. Lathes; drill presses, shapers.

Spencer Turbine Co., Hartford 6, Conn. Booth 2735. Vacuum cleaning equipment; turbo compressors.

Sperry Products, Inc., Danbury, Conn. Booth 1920. Ultrasonic instruments for detection of flaws and measuring thickness.

Standard Alloy Company, Cleveland 10. Booth 915. Heat resisting furnace parts.

Standard Electric Tool Co., Cincinnati 4. Booth 1628. Grinding, buffing and polishing equipment.

Standard Oil Co. of Ohio, Cleveland 15. Booth 1800. Cutting, drawing, grinding and honing lubricants.

Steel. Booth 1419. (See Penton Publishing Co.)

Sterling Tool Products Co., Chicago 22. Booth 2720. Portable sanding machines.

Stimpson Co., Inc., Edwin B., Brooklyn 5. Booth 2207. Screw machine parts; eyelets; rivets; snap fasteners; stampings.

Stokes Machine Co., F. J., Philadelphia 20. Booth 2040. Powder metal presses.

Stone Machinery Co., Inc., Syracuse, N. Y. Booth 2201. Metal cut-off machines.

Stuart Oil Co., Ltd., D. A., Chicago 23. Booth 426. Cutting and grinding oils.

Sun Oil Company, Philadelphia 3. Booth 1725. Petroleum products for the metalworking industry.

Superior Carbon Products, Inc., Cleveland 5. Booth 233. Carbon, graphite and metal-graphite brushes for generators and motors.

Superior Foundry, Inc., Cleveland. Booth 218. Castings.

Superior Tube Co., Norristown, Pa. Booth 2527. Small tubing of many metals.

Surface Combustion Corp., Toledo 1, Ohio. Booth 517. Heat treating furnaces and equipment.

T

Technical Metal Processing, Cleveland 15. Booth 1520. (See Salkover Metal Processing.)

Technical Publishing Co., Cleveland 13. Booth 1621. (See Industrial Publishing Co.)

Tempil Corporation, New York 11. Booth 525. Temperature-indicating crayons, pellets and paint.

Tennant Co., G. H., Minneapolis 11. Booth 1525. Floor cleaning and maintenance machines.

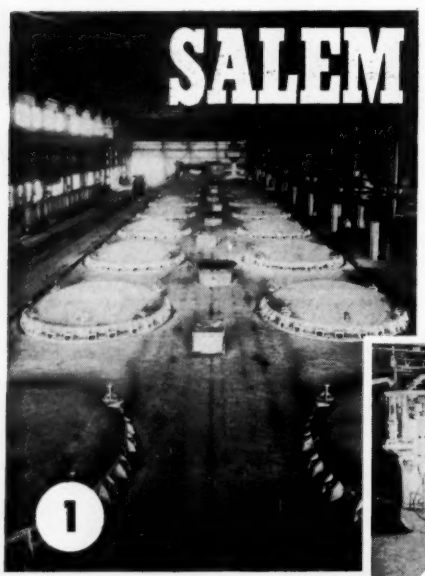
Texas Co., New York 17. Booth 2415. Cutting coolants and lubricants.

Tide Water Associated Oil Co., New York 4. Booth 2821. Industrial lubricants; cutting oils.

Timken Roller Bearing Co., Canton 6, Ohio. Booth 943. Seamless steel tubing; steel products.

Tin Research Institute, Inc., Columbus 1, Ohio, Booth 1502. Tin products; research publications.

Tinnerman Products, Inc., Cleveland 13. Booth 238. Speed Nuts and Speed Clips.



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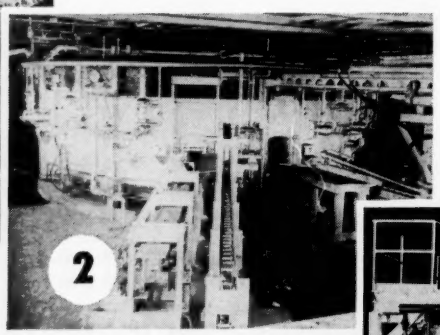
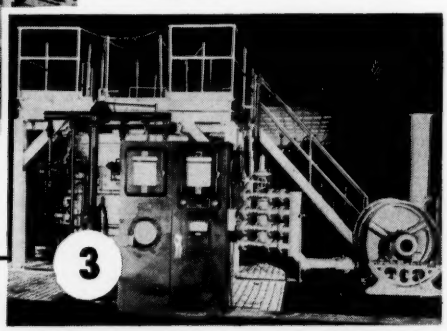


1 A recent circular pit installation.

2 Typical Rotary Hearth installation with automatic charge and discharge.

3 Small pit-type heat-treating furnace.



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Titanium Alloy Mfg. Div., Niagara Falls, N. Y. Booth 1112. Titanium alloys and products; refractories.

Tomkins-Johnson Co., Jackson, Mich. Booth 2216. Metalworking tools and equipment.

Torrington Mfg. Co., Torrington, Conn. Booth 1103. Spring coilers; metal slitting machines.

Towmotor Corporation, Cleveland 10. Booth 2545. Lift trucks and accessories for materials handling.

Turco Products, Inc., Los Angeles 11, Calif. Booth 1406. Industrial chemicals; cleaning compounds.

U

Uddeholm Co. of America, Inc., New York 17. Booth 205. Swedish steels; toolsteels.

Udylite Corp., Detroit 11, Mich. Booth 425. Plating and polishing equipment.

Union Carbide & Carbon Corp., New York 17. Booth 1926. (See National Carbon Co., Haynes Stellite Co., Linde Air Products Co.)

U. S. Air Force. Booth 2715. (See National Military Establishment.)

U. S. Army. Booth 2715. (See National Military Establishment.)

U. S. Hoffman Machinery Corp., New York 3. Booth 2332. Industrial cleaning equipment.

U. S. Navy. Booth 2715. (See National Military Establishment.)

U. S. Reduction Co., East Chicago, Ind. Booth 1751. Aluminum alloy ingots; aluminum fluxes.

Universal-Cyclops Steel Corp., Bridgeville, Pa. Booth 2215. Toolsteels; stainless and special steels.

Upton Electric Furnace Div., Commerce Pattern Foundry & Machine Co., Detroit, Mich. Booth 2015. Furnaces and salt baths.

V

Vanadium-Alloys Steel Co., Latrobe, Pa. Booth 1401. Toolsteels.

Vanadium Corp. of America, New York 17. Booth 914. Vanadium alloys, metals and chemicals.

Vapor Blast Mfg. Co., Milwaukee 9. Booth 1831. Liquid honing equipment.

W

Wall Chemical Division, Chicago. Booth 1116. (See Liquid Carbonic Corp.)

Wall Colmonoy Corporation, Detroit 3. Booth 508. Hard facing alloys.

Welding Engineer, New York 18. Booth 1428. Magazines; books; reprints.

Wellman Bronze and Aluminum Co., Cleveland. Booth 2620. Nonferrous castings.

Wells Mfg. Corp., Three Rivers, Mich. Booth 1908. Band saw machines.

Wells & Sons, W. F., Three Rivers, Mich. Booth 2002.

Wells, Inc., Martin, Los Angeles. Booth 2518. Electrodes and elec trode holders.

Westinghouse Electric Corp., Pittsburgh 30. Booth 2026. Welding machines; pure metals; magnetic materials; brazing alloys.

Wheelco Instruments Co., Chicago 7. Booth 2226. Temperature measurement, recording and control instruments.

Wilson Mechanical Instrument Co., New York 17. Booth 925. (Associated with American Chain and Cable Co., Inc.) Rockwell hardness testers; Tukon tester; Knoop indenter.

Worthington Pump & Machinery Corp., Harrison, N. J. Booth 1019. Welding and assembly positioning equipment.

Wright, Wilbur J., Lakewood, Ohio. Booth 1128. Manufacturers' agent.

Avoid Delay at the Registration Desk

See page 61 for Advance Registration Coupon; your badge giving admittance to the National Metal Exposition will be mailed to you.

METALLURGICAL ABSTRACTS

(GENERAL AND NON-FERROUS)

Comprehensive and authoritative, will keep you informed of the world's progress in research and practice in general and non-ferrous metallurgy.

Free to members of the Institute of Metals, they may be obtained by non-members either monthly, with the *Journal of the Institute of Metals* for £5 per annual volume or bound for £3 per annum (not including the Journal), both inclusive of indexes and the former inclusive of binding case.

The sections cover (1) properties of metals; (2) properties of alloys; (3) structure; (4) dental metallurgy; (5) powder metallurgy; (6) corrosion and related phenomena; (7) protection; (8) electro deposition; (9) electro-metallurgy and electro chemistry; (10) refining; (11) analysis; (12) laboratory apparatus, instruments, etc.; (13) physical and mechanical testing, inspection and radiology; (14) temperature measurement and control; (15) foundry practice and appliances; (16) secondary metals, scrap, residues, etc.; (17) furnaces, fuels and refractory materials; (18) heat-treatment; (19) working; (20) cleaning and finishing; (21) joining; (22) industrial uses and applications; (23) miscellaneous; (24) bibliography; (25) book reviews.

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Emil Gathmann Dies, Was Famous for Ingot Design

Emil Gathmann, Sr., president of Gathmann Engineering Co. of Baltimore, died on Aug. 23 after an illness of three months. Mr. Gathmann, who was 76, was a past national treasurer of the American Society for Metals, and was a recipient at the Society's last annual convention of a Distinguished Service Award for Meritorious Contributions to Alloy Steel Development.

E. Gathmann, Sr.

Holder of more than 100 patents for developments in the steelmaking and ordnance field, he is probably best known for his promotion of the big-end-up type of ingot mold.

Mr. Gathmann came to Baltimore in 1909, and started the Gathmann Engineering Co., manufacturers of ingot molds. He had previously organized an engineering firm in New York, and also served for a time as head of the ordnance department for Bethlehem Steel Co. He held many patents relating to naval ordnance, and won early fame as the inventor of a depth bomb to be used against submarines.

Metallurgical Field Is Guinea Pig for A.E.C. Declassification Trial

A trial program for examining selected declassifiable technological information in the field of metallurgy with a view to determining its possible value to American industry has been inaugurated by the Atomic Energy Commission.

To assist in developing the program a temporary advisory committee has been appointed. Representing the American Society for Metals on this committee is Ernest E. Thum, editor of *Metal Progress*.

Other members of the committee are: Sidney Kirkpatrick, chairman, McGraw-Hill Book Co.; H. A. Barton, American Institute of Physics; Gene Hardy, Chilton Publications, Inc.; Keith Henney, McGraw-Hill Publishing Co., Inc.; Edward Kreutsberg, Penton Publications; Harry Blank, Magazines of Industry, Inc.; Walter J. Murphy, American Chemical Society; W. A. Phair, Chilton; J. J. Smith, American Institute of Electrical Engineers; George Stetson, American Society of Mechanical Engineers; and F. J. Van Antwerpen, American Institute of Chemical Engineers.

The advisory committee will recommend members for a small working party, the members of which will be given full security clearance. From the information made available to it, the working party will recommend to the A.E.C. those portions which it believes should be considered for declassification because of their usefulness to American industry and technology.

Any information which the A.E.C. may actually declassify would be made available for publication by established journals in the field of metallurgy. The field of industrial technology was selected for the experiment because of a total of 2,400 papers declassified up to Jan. 1, 1949, only 133, or 5%, were in that field.

AVOID DELAY AT THE REGISTRATION DESK

See page 61 for Metal Show Advance Registration Coupon

Names New Representative

The American Platinum Works of Newark, N. J., is now represented by Steel Sales Corp. of Chicago for the distribution of silver brazing alloys and fluxes in the states of Illinois, Michigan, Indiana, Missouri, Wisconsin, Minnesota, Iowa, North Dakota, South Dakota, Nebraska and Kansas. Stocks are available in Chicago, Detroit, St. Louis and Milwaukee.

Etter Moves to New Haven

Etter Engineering Co. has announced the removal of its Wallingford, Conn., office to New Haven, Conn. Etter Engineering Co. represents Eclipse Fuel Engineering Co., the Partlow Corp., and Despatch Oven Co.

IMPORTANT MEETINGS FOR OCTOBER

Oct. 3-4 — National Association of Corrosion Engineers. South Central Region, Adolphus Hotel, Dallas, Tex., (G. R. Olson, chairman, General Arrangements Committee, c/o United Gas Pipe Line Co., Box 1407, Shreveport 92, La.)

Oct. 3-4—Steel Founders' Society of America. Fall Meeting, White Sulphur Springs, West Va. (C. W. Briggs, S.F.S.A., 920 Midland Bldg,. Cleveland 15.)

Oct. 3-6 — Association of Iron and Steel Engineers. Annual Convention, Pittsburgh. (T. J. Ess, managing director, A.I.S.E., Empire Bldg., Pittsburgh 22.)

Oct. 4—Society for Applied Spectroscopy. October Meeting, Socony-Vacuum Training Center, 63 Park Row, New York City. (Rodger W. Loofbourow, c/o Merck & Co., Inc., Chemical Control Division, Rahway, N. J.)

Oct. 5-8—Society of Automotive Engineers. Aeronautic and Aircraft Engineering Display, Los Angeles. (John A. C. Warner, secretary and general manager, S.A.E., 29 West 39th St., New York 18.)

Oct. 6—American Iron and Steel Institute. Regional Technical Meeting, Drake Hotel, Chicago. (George S. Rose secretary, A.I.S.I., 350 Fifth Ave., New York 1.)

Oct. 10-14 — American Society for Testing Materials. First Pacific Area National Meeting, Fairmont Hotel, San Francisco. (Robert J. Painter, assistant secretary, A.S.T.M., 1916 Race St., Philadelphia 3.)

Oct. 11-14—American Standards Association. 31st Annual Meeting, Waldorf-Astoria Hotel, New York. (Ruth E. Mason, A.S.A, 70 East 45th St., New York 17.)

Oct. 12-15—Electrochemical Society. Semi-annual meeting, Chicago. (R. M. Burns, secretary, 235 West 102nd St., New York 25.)

Oct. 13—American Iron and Steel Institute. Regional Technical Meeting, Hotel Pick-Ohio, Youngstown, Ohio. (George S. Rose, secretary, A.I.S.I., 350 Fifth Ave., New York 1.)

Oct. 17-20—American Gas Association. Annual Convention, Chicago. (M. A. Combs, secretary, A.G.A., 420 Lexington Ave., New York 17.)

Oct. 17-21—National Metal Congress and Exposition. Public Auditorium, Cleveland. See programs of cooperating societies in the first section of this issue of *Metal Review*. (W. H. Eisenman, director, 7301 Euclid Ave., Cleveland 3, Ohio.)

Oct. 24-28—National Safety Council. 37th National Safety Congress and Exposition, Chicago. (R. L. Forney, general secretary, N.S.C., 20 North Wacker Dr., Chicago 6.)

Oct. 26—American Iron and Steel Institute. Regional Technical Meeting, Hotel Thomas Jefferson, Birmingham, Ala. (George S. Rose, secretary A.I.S.I., 350 Fifth Ave., New York 1.)

Oct. 26-27—National Conference on Industrial Hydraulics. Sheraton Hotel, Chicago. (Sponsored by seven Chicago technical societies and Armour Research Foundation of Illinois Institute of Technology 3300 South Federal St., Chicago 16.)

Oct. 27-28—Porcelain Enamel Institute. 18th Annual Meeting, French Lick Springs Hotel, French Lick, Ind. (Industrial News Service, 526 Oliver Bldg., Pittsburgh 22.)

Oct. 27-28—Gray Iron Founders' Society, Inc. 21st Annual Meeting, Edgewater Beach Hotel, Chicago. (R. L. Collier, executive vice-president, G.I.F.S., 210 National City—East 6th Bldg., Cleveland 14.)

Oct. 27-29—American Society of Tool Engineers. 17th Semi-Annual Meeting, Montreal. (Harry E. Conrad, executive secretary, , A. S. T. E. 10700 Puritan Ave., Detroit 21.)

High School Students Get Wyzalek Awards

Students at six New Jersey vocational and technical high schools were winners of the John F. Wyzalek Memorial Awards presented annually by the New Jersey Chapter A.S.M. Three students at each school received a first prize of $25, second prize of $10, and an honorable mention. Each school participating received an A.S.M. membership.

The awards are made to outstanding students for original research reports of unusual merit on the heat treatment of steel. The subjects of the investigations and the names of the winners are as follows:

"Jominy Hardenability Test"—John Robert Rath, first prize; Eugene Kerek, second prize; Peter Mosuriak, honorable mention.

"Effect of Time and Temperature on the Depth of Carburizing"— Vincent F. Albanese, first prize; Michael Morongell, second prize; John A. Malmquist, honorable mention.

"The Effect of Time and Temperature Upon the Depth of Case Produced by Carburizing"—Stanley K. Lepski, first; Frank Popola, Jr., second; Peter Soriano, honorable mention.

"Hardening a Punch and Die to a Required Hardness"—Sam Abate, first; Anthony Papaleo, second; William Flannery, honorable mention.

"The Effect of Tempering Hardened Steel"—Douglas C. Whritenour, first, Walter J. Shuart, second; Evvy Rotella, honorable mention, Sam Pelosi, honorable mention.

"The Metcalf Experiment"—John Marcisin, first; Nicolas Merlo, second; George De Franca, honorable mention.

Compliments

To W. E. MAHIN, formerly chairman of metals research at Armour Research Foundation, on his promotion to director of research. Dr. Mahin is vice-chairman of the Chicago Chapter A.S.M. and is currently serving on the Society's national Publications Committee.

♦ ♦ ♦

To HOWARD E. HANDY of Saco-Lowell Shops, Biddeford, Maine, on serving his 25th year as secretary of the Boston Chapter A.S.M.

♦ ♦ ♦

To KARL M. KNAPP, district sales manager for the Universal-Cyclops Steel Corp. in Pittsburgh, on his election as one of the 186 district governors of Rotary International.

Two Secretaries Honored For Ten Years of Service To A. S. M. Chapters

Two secretaries of A.S.M. chapters will be honored during the National Metal Congress for having completed ten years of continuous service as secretary. They are Harold E. Krayenbuhl, metallurgical engineer, Oliver United Filters, Oakland, Calif., secretary of the Golden Gate Chapter; and L. A. Zeitz, industrial engineer, East Ohio Gas Co., secretary of the Canton-Massillon Chapter.

H. E. Krayenbuhl

Secretaries Zeitz and Krayenbuhl will attend the National Metal Congress and Exposition in Cleveland during the week of Oct. 17 through 21 as guests of the American Society for Metals. They will each receive an appropriate certificate during the annual meeting of the Society on Wednesday morning, Oct. 19, and will also be seated at the speakers' table during the annual banquet on Thursday evening.

The Reviewing Stand

WHY THE A.S.M. Review of Metal Literature? This question apparently has been puzzling one of our overseas subscribers, for he writes: "Since this abstracting service began as recently as 1944, may I venture to ask for the reasons which prompted your society to establish it."

It strikes us that perhaps other readers—and users of the service—may have wondered about the background of the Review of Metal Literature, and a clarification of its basic aims and purposes may be in order. We therefore take the liberty of quoting from our reply:

The purpose of the A.S.M. Review of Metal Literature is threefold:

1. To provide A.S.M. members with a readily available abstracting service covering the entire field of metallurgy. It was deemed that an invaluable service would be rendered to its members by the American Society for Metals if they could be provided with a timely and up-to-date monthly literature survey at no extra cost. *Chemical Abstracts, Engineering Index*, the British *Metallurgical Abstracts,* and similar journals are doubtless available to many A.S.M. members, but not to all, and it was felt that this was one of the functions that should be performed by the A.S.M. for its members.

2. Complete coverage of the metallurgical field. While it is true that *Chemical Abstracts* has an important section devoted to metallurgy and metallography, there are certain aspects of mechanical metallurgy, metalworking, mechanical testing of metals, which that journal does not cover. For instance, our sections on machining, working, testing, joining (welding), miscellaneous fabrication, applications, and design contain many literature references not included in *Chemical Abstracts.* Much of this type of material is covered by *Engineering Index,* but the references are so widely scattered through so many sections of this extensive publication that its price would be out of range of most individuals, and its use confined largely to reference libraries.

3. Prompt publication. While in most abstracting services, the gap between appearance of the original article and publication of the abstract is generally four to six months, the Review of Metal Literature attempts in each issue to cover everything published the preceding month (except foreign, which is governed by delivery delays). In this respect, we believe it to be the most timely and prompt abstracting service in the world.

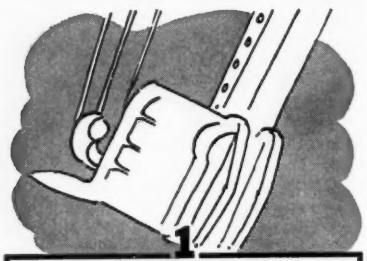
To recapitulate, the A.S.M. Review of Metal Literature was not originally intended as a research or library tool, although the annual bound and indexed volumes are serving that purpose admirably. Its purpose is to give the busy man (the practical metallurgist, executive or shopman as well as the research worker) an opportunity to glance through its classified sections and determine what articles in the literature published the preceding month he ought to read in order to keep up to date in his field. The brief digests, therefore, are not literally abstracts but are better designated as annotations. They are indicative rather than informative and are not intended to serve as a substitute for reading the article but rather to indicate whether it is something which the individual would like to read.

M.R.H.

A. S. M. Review of Current Metal Literature

An Annotated Survey of Engineering, Scientific and Industrial Journals and Books Here and Abroad, Received During the Past Month

Prepared in the Library of Battelle Memorial Institute, Columbus, Ohio
W. W. Howell, Technical Abstractor



1 ORE BENEFICIATION and RESERVES

1B—Ferrous

1B-53. The Preparation of Iron Ore for Blast Furnace and Open Hearth Use. Robert R. Williams, Jr. "Yearbook of the American Iron and Steel Institute, 1948", p. 368-386; discussion, p. 387-390.

Previously abstracted from *American Iron and Steel Institute,* preprint, item 1B-14, 1948.

1B-54. European Experience in Rotary Kiln Nodulizing of Iron Fines and Flue Dust. H. Berg. *Blast Furnace and Steel Plant,* v. 37, July, 1949, p. 799-801.

1B-55. The Problem of Iron Ore and How It Will Be Solved. A. H. Hubbell. *Engineering and Mining Journal,* v. 150, July 1949, p. 84-91.

Extensive survey consists of separate sections on beneficiation of Mesabi taconite; and ore reserves in Labrador, Venezuela, and Liberia.

1C—Nonferrous

1C-53. Flotation of Gold-Copper Ore From the Laloki Mine, Sapphire Creek, Papua. K. S. Blaskett and H. H. Dunkin. *Council for Scientific and Industrial Research and the University of Melbourne, Metallurgical Laboratory* (Joint Investigations), Ore-Dressing Investigation No. 349, Oct. 21, 1948, 17 pages.

Results of an investigation on the effect of aeration before flotation on recovery of copper. Flotation tests.

1C-54. Electrostatic Separation. Interim Report No. 1; Preliminary Studies. S. B. Hudson. *Commonwealth Scientific and Industrial Research Organization and the University of Melbourne* (Joint Investigations), Ore-Dressing Investigation No. 372, May 24, 1949, 21 pages.

Variation of displacement of the median with voltage. A flotation zircon concentrate was given various treatments, which altered the ranges of reversibilities.

1C-55. Investigation of Tin-Bearing Pegmatites in the Tinton Area, Lawrence County, S. Dak. William F. Jahn and Paul E. Pesonen. *U. S. Bureau of Mines, Report of Investigations* 4484, July 1949, 25 pages.

Description of beneficiation tests.

1C-56. Uranium and Atomic Energy. W. H. Dennis. *Mine & Quarry Engineering,* v. 15, July 1949, p. 211-218.

Various aspects including occurrence, concentration methods (includes flow-sheets), preparation of the metal, principles of atomic energy, methods of separation of isotopes, military and industrial uses, radioactive isotopes, and the "breeding" system.

1C-57. Beating a Lead Oxide Mill Fee. *Mining World,* v. 11, July 1949, p. 10-13.

Method to recover lead oxide minerals in a mixed mill feed. Although the method is not entirely satisfactory, tailing losses have been reduced materially. A comparatively simple rearrangement of the recovery elements and the addition of Denver flotation cells resulted in the benefits described.

For additional annotations indexed in other sections, see:
25C-47

2 SMELTING, REDUCTION and REFINING

2B—Ferrous

2B-211. Proper Sizing, Screening and Preparation of Blast Furnace Coke. D. P. Cromwell and C. A. Covington. "Yearbook of the American Iron and Steel Institute, 1948", p. 162-179; discussion, p. 180-188.

Practice at Campbell Coke Works of Youngstown Sheet & Tube Co. Emphasizes necessity for rigid control of above procedures.

2B-212. Effect of Coke Quality on Blast Furnace Iron Tonnage. E. J. Gardner. "Yearbook of the American Iron and Steel Institute, 1948", p. 189-201; discussion, p. 202-211.

Previously abstracted from *Blast Furnace and Steel Plant,* item 2b-126, 1948.

2B-213. Tonnage Oxygen for Increased Iron and Steel Production. J. H. Strassburger. "Yearbook of the American Iron and Steel Institute, 1948", p. 214-249; discussion, p. 250-259.

Previously abstracted from *Steel,* item 2b-184, 1948.

2B-214. Some Practical Aspects of Direct Oxidation in the Basic Open Hearth Process. Frank G. Norris and Edward B. Hughes. "Yearbook of the American Iron and Steel Institute, 1948", p. 260-280; discussion, p. 281-286.

On the basis of study of two series of heats with special attention to refining practice.

2B-215. Use of Oxygen for Decarburization and Melting in Electric Furnaces. J. H. Eisaman. "Yearbook of the American Iron and Steel Institute, 1948", p. 287-296; discussion, p. 296-298.

Previously abstracted from *American Iron and Steel Institute,* preprint, item 2B-128, 1948.

2B-216. Experience to Date on Iron Production by Methods Other Than Coke Blast Furnace; Direct Reduction. Earle C. Smith. "Yearbook of the American Iron and Steel Institute, 1948", p. 302-342; discussion, p. 343-345.

Especially sponge-iron methods, giving history and present status of methods and equipment used in China, Sweden, Africa, and other parts of the world. 25 ref.

2B-217. Factors Affecting Surface Quality of Steel Products. L. R. Walker. *Industrial Heating,* v. 16, July 1949, p. 1216, 1218.

Effect of higher soaking temperature, increased soaking time, increased nozzle size, increased holding time after teeming and coating of new molds are evaluated as to surface and internal defects.

2B-218. Nodular Iron—The Patent Situation. Oliver Smalley. *Iron Age,* v. 164, July 14, 1949, p. 68, 72.

Another "Letter to the Editor" continues the controversy between Smalley of Meehanite Metal Corp. and Morrogh of British Cast Iron Research Assoc. regarding priority in development of nodular iron. (See May 19 and June 16 issues.)

2B-219. Reducing Coke Consumption in Iron and Steel Production. Magnus Tigerschiold. *Iron Age,* v. 164, July 14, 1949, p. 84-91.

Swedish accomplishments with respect and previously unpublished Swedish data. The roles of beneficiating, sintering, high top pressures, oxygen-enriched blast, electric smelting, and sponge iron. 29 ref.

2B-220. Expansion Program Increases Capacity at Bethlehem's Sparrows Point Plant. *Steel,* v. 125, July 18, 1949, p. 102, 104, 107, 122.

Expansion of facilities in the coke, blast furnace, and openhearth departments together with many newly installed and revamped rolling units.

2B-221. Adsorption Phenomena on the Surface of Molten Steel. (In Russian.) B. V. Stark and S. I. Filippov. *Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk* (Bulletin of the Academy of Sciences of the USSR, Section of Technical Sciences) Mar. 1949, p. 413-420.

Studied in order to establish the basic laws of adsorption of carbon and oxygen dissolved in iron and the possible effects of these surface phenomena on decarburization. Method of investigation. The importance of surface phenomena during steel refining.

2B-222. Contribution a l'étude de l'utilisation des Cowpers dans la sidérurgie. (Contribution to the Study of the Use of Cowpers Stoves in Ferrous Metallurgy). M. G. Namy. *Circulaire d'Informations Techniques,* v. 6, Mar. 1949, p. 121-140.

Results of an extensive theoretical and experimental investigation of the above, used to heat the air for blast furnaces. Factors influencing efficiency. Optimum conditions of operation and different types of equipment. Equations for calculation of various steps of the operation.

2B-223. The Effects of Zirconium in Cast Iron. C. M. Offenhauer and J. F. Collins. *Canadian Mining and Metallurgical Bulletin,* v. 42, July 1949, (*Transactions of the Canadian Institute of Mining and Metallurgy,* v. 52), p. 338-348; discussion p. 348-350.

The literature and results of experiments. Zirconium markedly affects the formation of graphite in cast iron according to the composition of the iron and the amount of the zirconium addition. Usually, it is employed in the form of a complex addition agent in order to facilitate its introduction and to guide its effects. 25 ref.

2B-224. Cupola Charge Materials. Report and Recommendations of Sub-Committee T. S. 27 of the Technical Council. *Foundry Trade Journal,* v. 87, July 7, 1949, p. 19-25; July 14, 1949, p. 45-51; July 21, 1949, p. 81-86; July 28, 1949, p. 119-124.

Metallics, fuels, and fluxes are considered in that order in the first three installments. Variations of composition, physical condition, etc., and recommends methods of combating adverse effects. Techniques for making the best use of nonideal materials. The final installment contains tables dealing with charge calculation and also a selected bibliography. 75 ref.

2B-225. Making Steel from Argentine High-Phos Pig Iron. E. J. Ash. *Steel,* v. 125, Aug. 8, 1949, p. 78, 81.

Experimental heats made at an Ohio electric-furnace shop using an all-pig charge demonstrate the feasibility of the practice on a commercial scale in Argentina.

2B-226. (Book) **Progress in Steelmaking.** 106 pages. Steel Magazine, Penton Bldg., Cleveland 13, Ohio. $3.00.

A collection of 32 articles apparently reproduced from various issues of *Steel* published during the past few years. Miscellaneous topics concerning the process itself and auxiliary subjects such as coal washing, ore beneficiation, refractories, furnaces, handling equipment, analyses, temperature measurement, lubricants, pickling, tinning, rolling.

2C—Nonferrous

2C-39. New Smelter to Produce Most of U. S. Antimony. *Engineering and Mining Journal,* v. 150, July 1949, p. 140-141.

New $1,500,000 antimony smelter being built near Stibnite, Idaho. Flow diagram.

2C-40. Inco Develops New Processes. *Engineering and Mining Journal,* v. 150, July 1949, p. 144.

Flash smelting process developed at Copper Cliff, Ontario, Canada. It will use oxygen and heat from flash roasting to smelt flotation concentrate. Savings will be in fuel cost and byproducts.

2C-41. Cominco's Streamlined Smelter. *Engineering and Mining Journal,* v. 150, July 1949, p. 139.

New lead smelter under construction at Trail, B. C.

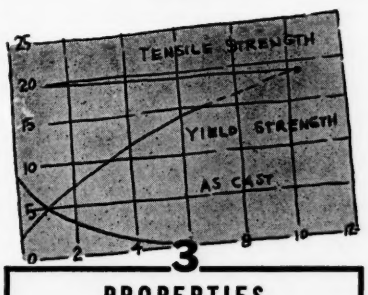
2C-42. The Preparation and Some Properties of Ductile Titanium. H. W. Worner. *Metallurgia,* v. 40, June 1949, p. 69-76.

Using a modification of the Knoll process in which no protective atmosphere of helium is needed. Australian raw materials were used. Each particle of titanium powder produced was porous, suggesting that the metal formed as a sponge-like mass during the reduction reaction. The chief metallic impurities were Fe, Mg and Pb, but the latter two impurities could be practically eliminated either by melting in an argon atmosphere or by heating to 1000° C. for several hours in a vacuum. Powder-metallurgy and argon-arc-melting methods for compacting the powder; mechanical working of as-melted Ti; effect of cold drawing on mechanical properties and structure of Ti wire; and annealing techniques.

2C-43. Complex Sulfates Containing Tri- and Pentavalent Columbium and the Possibility of Their Use in the Purification of Columbium. Edward W. Golibersuch and Ralph C. Young. *Journal of the American Chemical Society,* v. 71, July, 1949, p. 2402-2405.

Above sulfates were prepared and their crystal structures examined. Suggests above possibility.

For additional annotations indexed in other sections, see: 16B-78



3 PROPERTIES

3A—General

3A-149. Elastische Eigenschaften. (Elastic Properties.) W. Köster. "Allegemeine Metallurgie" (Office of Military Government for Germany), 1948, p. 41-47.

German literature on elastic properties of metals for 1939-46 not covered in the FIAT Review, "Physik der Festen Korper". Main topics are: temperature and concentration variations of modulus of elasticity; influence of mechanical and thermal treatment and of ferromagnetic state on modulus of elasticity; measurements on single crystals; general observations; and determination of modulus of elasticity. 26 ref.

3A-150. Inwendige demping bij metalen. (Internal Friction in Metals.) H. C. den Daas. *Centraal Instituut voor Materiaal Onderzoek Afdeling Metalen,* Mar. 1949, p. 5-9.

Various physical origins of internal friction, as far as known at present. The sources are classified as diffusion and viscosity effects.

3A-151. Plastische vervorming van kristallen volgens de opvatting van Taylor. (Plastic Deformation of Crystals According to Taylor's Theory.) N. A. Brunt. *Metalen,* v. 3, Apr. 1949, p. 169-175.

Theory of dislocations. The generation and movement of dislocations under the influence of the stress field and the possibility for explaining the work hardening in metals, by this theory. Finally, the more general treatment of the problem, as published by J. M. Burgers, is mentioned.

3A-152. Untersuchungen an verschiedenen pauschal unmagnetischen Zuständen. (Investigations on Different Completely Nonmagnetic States.) Hermann Fahlenbrach and Klaus Sixtus. *Zeitschrift fur Metallkunde,* v. 40, May 1949, p. 187-193.

Measurements on different materials showed that the initial permeability of samples reduced by demagnetization to the totally nonmagnetic state is decreased by vibration. This effect was observed for variously treated alloys of Fe with Ni, Si, or Al; and for pure Ni. 17 ref.

3A-153. Study of the Plasticity of Sheet Materials. Ya. B. Fridman and A. A. Bat. *Metallurgia,* v. 40, June 1949, p. 121. Translated and condensed from *Zavodskaya Laboratoriya* (Factory Laboratory), v. 14, Dec. 1948, p. 1462-1469.

Previously abstracted from original, item 3A-79, 1949.

3A-154. Dislocations as a Cause of Mechanical Damping in Metals. J. D. Eshelby. *Proceedings of the Royal Society,* ser. A, v. 197, June 22, 1949, p. 396-416.

A theoretical discussion of thermoelastic effects due to stationary and moving dislocations. Need for further theoretical and experimental study. 18 ref.

3A-155. Fatigue and Mechanical Properties. Is there a Relation Between Them? Francis G. Tatnall. *Western Machinery and Steel World,* v. 40, July 1949, p. 88-89, 100.

Concludes that there is probably no definite relationship between the two types of properties. Steps for study of effective strength of structures in service.

3A-156. Tests of Insect Wire Screening. H. W. Burney and H. B. Williams. *Journal of Southern Research,* v. 1, July 1949, p. 4-8.

Data on nine types (light metallic and one plastic). The following tests were made: tensile strength, steady-load deflection; impact load; bend resistance; abrasion resistance; expansion and contraction; and passage of light and air.

3B—Ferrous

3B-152. The Metallography and Properties of High Alloy Hot Work Steels. Peter Payson and A. E. Nehrenberg. "Yearbook of the American Iron and Steel Institute, 1948", p.540-570; discussion, p.570-574.

Data for two chromium and two tungsten hot work steels. Results are not considered conclusive, but as bases for development of improved materials. Mechanical properties, microstructures, transformation characteristics, and effects of heat treatment. 22 ref.

3B-153. Untersuchungen uber die Eig-

nung von Chrom-Vanadin-Stählen fur Warm- und Schnellarbeitswerkzeuge. (Investigation of the Suitability of Chromium-Vanadium Steels for High-Temperature and High Speed Tools.) Wirfried Connert, Eduard Maurer, and Robert Scherer. *Archiv fur das Eisenhuttenwesen,* v. 20, May-June 1949, p. 179-188.

Study of the Fe corner of the Fe-C-Cr-V constitution diagram. The properties of different tool compositions. 17 ref.

3B-154. Ruckdehnung beim Dauerstandversuch. (Elastic Elongation in the Creep-Stress Test.) Alfred Krisch and Anton Pomp. *Archiv fur das Eisenhuttenwesen,* v. 20, May-June 1949, p. 189-195.

Investigated in relation to time, temperature, and applied load for four different steels, the results frequently disagreeing with existing theories. 37 ref.

3B-155. Zur Frage des Spannungsabbaues durch Schwingungsbeanspruchung. (Concerning the Question of Stress Relief by Application of Alternating Stresses.) Helmut Neerfeld and Hermann Muller. *Archiv fur das Eisenhuttenwesen,* v. 20, May-June 1949, p. 205-210.

Experiments which show that above applied to steel bars considerably reduce their stresses and favorably affect their strength properties.

3B-156. The Addition of Tungsten to Cast Iron. J. E. Hurst. *Metallurgia,* v. 40, June 1949, p. 101-102.

Use of tungsten oxide reducing-agent additions and of high-speed steel as an addition agent. Apart from enhanced mechanical strength, the increase of elastic modulus, in both white and gray iron, as the W content increases, is worthy of note. Data are tabulated and charted.

3B-157. Molybdenum-Bearing Stainless Casting Alloy Has Wide Range of Uses. Norman S. Mott. *Materials & Methods,* v. 30, July 1949, p. 50-53.

Corrosion-resistant, physical, and mechanical properties of allov with improved corrosion resistance and increased strength at elevated temperatures. Applications. 13 ref.

3B-158. Resistance of a Gun Steel to Explosive Impact. F. Poboril. *Metal Progress,* v. 56, July 1949, p. 58-61.

Explosive toughness (measured by the powder charge needed to split a heat treated capsule) has a linear relationship to Charpy impact of the same steel at −78° C., thus confirming Zener and Hollomon's thesis that the effect of very high speed of impact loading can be replaced by low temperature of a specimen tested at normal speeds.

3B-159. A New Low-Alloy Steel for High-Temperature Use. George F. Comstock. *Metal Progress,* v. 56, July 1949 p. 67-71. Condensed from "Ferritic Low-Alloy Titanium-Boron Steel for Use at Moderately High Temperatures".

Previously abstracted from *Iron Age,* item 3B-134, 1949.

3B-160. New Ductile Cast Iron Developed. *Skillings Mining Review,* v. 38, July 23, 1949, p. 6. Reprinted from *Nickel Topics,* Mar. 1949.

Properties of new cast iron. It is characterized by a graphite structure in the form of spheroids, free from graphite in the flake form.

3B-161. Aciers russes au chrome-silicium-cuivre et au chrome-silicium-aluminium réfractaires et résistants a chaud. (Russian Chromium-Silicon-Copper and Chromium-Silicon-Aluminum Heat-Resistant Steels.) M. P. Braun. *Circulaire d'Informations Techniques,* v. 6, Mar. 1949, p. 115-119. Translated and condensed from *Stal* (Steel), Jan. 1948, p. 60-64.

The influence of different alloying elements such as Si, Cu, and Al, and of heat treatment, microstructure and mechanical characteristics of chromium steels. Chemical compositions of various test specimens and their mechanical properties.

3B-162. Influence of Size of Ferrite Grains on Strength of Iron and Steel During Brittle Fracture. (In Russian.) Yu. M. Potak and V. V. Sachkov. *Zhurnal Teknicheskoi Fiziki* (Journal of Technical Physics), v. 19, Mar. 1949, p. 399-407.

Proposes a new theoretical relationship between tensile strength of iron and grain size. Experimental investigation of low-alloy steels (0.25-0.51% C, 0.2-1.03% Si, 0.45-1.05% Mn, up to 1.42% Cr, 0.6-0.5% Mo, 0.64% Al, and 0.1% V) confirmed validity of the proposed formula.

3B-163. Variation of Damping Under Cyclic Stresses Below and Above the Fatigue Limit. (The Problem of the Physical Nature of Fatigue.) (In Russian.) L. A. Glikman, V. A. Zhuravlev, and T. W. Snezhkova. *Zhurnal Tekhnicheskoi Fiziki* (Journal of Technical Physics), v. 19, Apr. 1949, p. 448-476.

Investigated using a specially developed apparatus on two low-carbon and one high-Cr stainless steel at different stress amplitudes above and below the fatigue limit. The influence of intermediate aging and annealing on the variations. 15 ref.

3B-164. Some Effects of Tension on Magnetization Processes. (In English.) K. H. Stewart. *Physica,* v. 15, Apr. 1949, p. 235-240.

Effects and their theoretical interpretation. Attempts to verify the latter by experimental work on the British "Hipersil" alloys.

3B-165. Magnetic Behaviour of Ferromagnetics at High Frequencies. (In English.) H. J. Van Leeuwen. *Physica,* v. 15, Apr. 1949, p. 258-263.

Results obtained at Delft, Holland, during the last few years, correlating them with the literature. 16 ref.

3B-166. Losses Due to Eddy Currents Caused by Magnetic Skin-Effects in Sheet Steel. (In Russian.) S. D. Margolin. *Doklady Akademii Nauk SSSR,* (Reports of the Academy of Sciences of the USSR), new ser., v. 65, Apr. 11, 1949, p. 665-667.

The method for determination of the above, ferromagnetic sheets being located in an alternating electromagnetic field. Formulas for calculation.

3B-167. Variation of Core Loss and Permeability of Electric Grade Silicon Sheet Steel. A. C. Beiler and P. L. Schmidt. *American Society For Testing Materials,* "Symposium on Magnetic Testing", 1949, p. 82-93; discussion p. 94-95.

Statistical methods were applied to the analysis of frequency distributions of core loss and permeability-test values obtained from suppliers' reports of single tests on 11,000 lb. lots of electrical sheet steel over a considerable period of time. Results indicate that variability within a lot of material is substantially the same as variability from lot to lot.

3B-168. Influence of Lead on Behavior of Stainless Steel. S. Bergh. *Iron Age,* v. 164, July 14, 1949, p. 96-99. Translated from *Jernkontorets Annaler,* v. 132, No. 6, 1948, p. 213-220.

3B-169. Selection of Heat Resistant Steels. II (Concluded.) J. B. Henry. *Product Engineering,* v. 20, Aug. 1949, p. 113-115.

Effects of extended exposure on mechanical properties; embrittlement; intergranular precipitation; thermal stresses; and relative costs.

3B-170. Chill Depth of Cast Iron Increased by Boron. *Steel,* v. 125, Aug. 15, 1949, p. 102, 104.

Previously abstracted from paper by A. I. Krynitsky and Harry Stern, *American Foundrymen's Society,* Preprint No. 47, 1949, item 3B-67, 1949.

3C—Nonferrous

3C-139. Different Explanations of the Influence of Additions on the Heat Resistance of Binary Copper Alloys. (In Russian.) M. V. Zakharov. *Doklady Akademii Nauk SSSR* (Reports of the Academy of Sciences of the USSR), new ser., v. 65, Mar. 21, 1949, p.337-339.

Investigation of various binary and quasi-binary Cu-alloy systems indicates that they can be classified into three distinct types: those in which heat resistance decreases rapidly up to 500° C., and then decreases; those in which it continues to increase regularly even above 500° C.; and a combination type which may decrease near 500° C., but which increases again at higher temperatures on account of diffusion.

3C-140. Einsatz von Bleibronzelagern in Motorenbau. (The Use of Lead-Bronze Bearings in Engine Construction.) B. Garre. *Archiv fur Metallkunde,* v. 2, Apr. 1949, p. 143-145.

Frictional properties of above bearings as compared with babbitt bearings. The behavior of babbitt metal, Ag, Pb-bronze, and Cu. Because of its hydrogen content, electrolytic Cu is found to have good frictional properties.

3C-141. The Electric Resistance of a Germanium Rod at Low Temperatures. (In English.) A. N. Gerritsen. *Physica,* v. 15, May 1949, p. 427-432.

Resistance was measured down to 1.6° K., in order to determine suitability of this material for resistance thermometry in the temperature region of liquid helium. It was found that the material is not very suitable for this purpose.

3C-142. Aimantation initiale d'un monocristal du composé défini Mn_2Sb suivant les axes de facile et difficile aimantation. (Initial Magnetization of a Monocrystal of Definite Composition Mn_2Sb Along Its Axes of Easy and Difficult Magnetization.) Charles Guillaud, Roger Bertrand, and Roger Vautier. *Comptes Rendus,* v. 228, May 2, 1949, p. 1403-1405.

A previous note (v. 227, 1948, p. 47 item 3c-84, 1948) gave results obtained with the cobalt monocrystal. It was shown that the quaternary axis is the axis of ready magnetization at room temperatures. However, in this paper it is shown that Mn_2Sb interchanges its axes of easy and difficult magnetization at about −33° C.

3C-143. The Embrittlement of Tough-Pitch Copper by Bismuth. A. P. C. Hallowes. *Journal of the Institute of Metals,* v. 75, June 1949, p. 839-854.

It is shown by notched-bar and tensile tests that if Bi-bearing tough-pitch Cu is rapidly cooled from a high temperature, then cold worked, and finally recrystallized by annealing at a low temperature, embrittlement occurs at the heat treatment temperature and persists at room temperature after cooling. Practical aspects of results and recommendations for avoiding embrittlement.

3C-144. The Fermi Gas Model Applied to the Thermal Electromotive Forces of Tin, Lead, and Indium. George C. Pimentel and Raymond K. Sheline. *Journal of Chemical Physics,* v. 17, July 1949, p.644-647.

The absolute thermoelectric powers of Sn, Pb, and In in the range 2-10° K. are taken from data of Keesom and Matthijs. The temperature dependence of thermal e.m.f. is parabolic, as predicted for a Fermi gas. Fermi energies of the three metals are calculated to be 5.72, 2.89, and 1.20 ev., respectively. Low temperature specific heat data then provide an estimate of the number of conduction electrons per atom. 16 ref.

3C-145. Ultrasonic Velocities of Sound in Some Liquid Metals. O. J. Kleppa. *Journal of Chemical Physics,* v. 17, July 1949, p.668.

Sound velocities and their temperature coefficients, adiabatic and isothermal compressibilities, densities, coefficients of thermal expansion, and specific heats for Na, K, In, Sn, and Hg. For the latter, data at 50 and 150° C. are given.

3C-146. Superconductors in Alternating Magnetic Fields. Robert T. Webber, J. M. Reynolds, and T. R. McGuire. *Physical Review,* ser. 2, v. 76, July 15, 1949, p. 293-295.

A simple technique of determining the superconducting transitions of small and irregularly shaped samples was applied to the determination of the transitions and critical magnetic field curves of Sn and V. 12 ref.

3C-147. Note on the Resistivity of Gold at Low Temperatures. C. T. Lane. *Physical Review,* ser. 2, v. 76, July 15, 1949, p. 304-305.

Measured by comparing electrical resistivity of an Au crystal with Bloch's model whose resistivity is zero.

3C-148. Magnetic Effects of a Rotating Superconductor. W. F. Love, R. F. Blunt, and P. B. Alers. *Physical Review,* ser. 2, v. 76, July 15, 1949, p. 305.

Investigated for a superconducting tin rotor.

3C-149. Proton Stopping Power of Gold. Torben Huus and C. B. Madsen. *Physical Review,* ser. 2, v. 76, July 15, 1949, p. 323.

Proton resonances F-339 and Al-986 were used as energy indicators.

3C-150. Titanium . . . Its Prospects . . . Its Properties. R. I. Jaffee and I. E. Campbell. *Iron Age,* v. 164, July 28, 1949, p. 48-51.

Also considers metallurgical concepts in alloying and in applying the material to high-temperature service.

3D—Light Metals

3D-54. Die Mikrohärte rekristallisierender Aluminiumbleche. (The Microhardness of Recrystallized Sheet Aluminum.) Hans Joachim Wallbaum and Renate Misoher. *Zeitschrift fur Metallkunde,* v. 40, May 1949, p. 179-182.

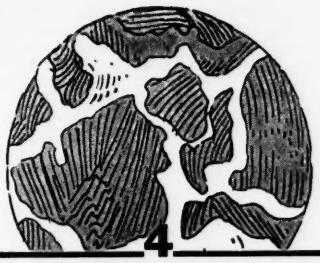
Proves by microhardness measurements that the recrystallization of very pure Al is a sudden process and that the hardness values are much more consistent if deformation starts with a monocrystal.

3D-55. Mechanical Tests and the Working Properties of Metals. G. Fitzgerald-Lee. *Aircraft Engineering,* v. 21, July 1949, p. 220-221, 226.

Notes on the use of test data in the choice of materials with particular reference to aluminum and its alloys.

For additional annotations indexed in other sections, see:

2C-42-46; 5B-19; 5C-14; 6D-25; 18B-119-133; 23A-22; 25C-47



4 CONSTITUTION and STRUCTURE

4A—General

4A-70. On the Structure of the High Temperature Metals. Russell Franks. "Yearbook of the American Iron and Steel Institute, 1948", p. 509-532; discussion, p. 532-539.

Previously abstracted from *American Iron and Steel Institute,* preprint, item 4A-28, 1948.

4A-71. Feinstruktur der Metalle und Legierungen. (Microstructure of Metals and Alloys.) U. Dehlinger and H. Nowotny. "Allegemeine Metallurgie" (Office of Military Government for Germany), 1948, p. 1-39.

Comprehensive review of German literature for 1939-46 consists of two sections: "Chemical Physics of Alloys," by Dehlinger; and "Crystal Structure of Intermetallic Phases," by Nowotny. 168 ref.

4A-72. Legierungslehre. (Alloy Science.) O. Kubaschewski, E. Gebhardt, R. Vogel, Th. Heumann, and A. Schrader. "Allegemeine Metallurgie" (Office of Military Government for Germany), 1948, p. 49-101.

Reviews German literature for 1939-46. Separate sections cover thermochemistry of metals and alloys (Kubaschewski); structure of binary alloys (Gebhardt); of ternary alloys (Vogel and Heumann); and of quaternary alloys (Schrader). 249 ref.

4A-73. Zustandsänderungen. (Changes of State.) E. Scheil, O. Kubaschewski, and W. Hofmann. "Allegemeine Metallurgie" (Office of Military Government for Germany), 1948, p. 103-123.

Reviews German literature for 1939-46. Separate sections are as follows: properties and crystallization of metal melts (Scheil); diffusion in metals (Kubaschewski); and transformations in the solid state (Hofmann). 79 ref.

4A-74. Plastische Verformung und Rekristallisation. (Plastic Deformation and Recrystallization.) A. Kochendörfer. "Allegemeine Metallurgie" (Office of Military Government for Germany), 1948, p. 125-145.

Reviews German literature for 1939-46. 107 ref.

4A-75. Nature of Eutectic Alloys. (In Russian.) S. V. Avakyan and N. F. Lashko. *Doklady Akademii Nauk SSSR* (Reports of the Academy of Sciences of the USSR), new ser., v. 65, Mar. 1, 1949, p. 29-32.

On the basis of existing experimental data, three conditions for the existence of eutectic alloys are proposed: homogeneity, ability for close contact, and similarity in probability of formation of nuclei in the liquid state. A series of hitherto unexplained phenomena is thus clarified. 30 ref.

4A-76. The Electronic Structure of Metals. (In English.) R. Kronig. *Physica,* v. 15, Apr. 1949, p. 1-12; discussion, p. 11-12.

The development of modern theories.

4A-77. Het ontstaan van tweelingkristallen en hun bouw. (The Formation and Structure of Twin Crystals.) P. E. A. van Nieuwland. *Metalen,* v. 3, Apr. 1949, p. 182-183.

From a metallographic point of view.

4A-78. The Refinement of Atomic Parameters by the Technique Known in X-Ray Crystallography as "the Method of Steepest Descents." A. D. Booth. *Proceedings of The Royal Society,* ser. A., v. 197, June 22, 1949, p. 336-355.

Three techniques are derived: the "relaxation method" the "least squares" refinement, and method of "steepest descents". These are examined in detail and their virtues and defects noted. Application of the steepest-descent procedure to various types of structure analysis.

4A-79. Effects of Internal Stresses. M. G. Corson. *Metal Progress,* v. 56, July 1949, p. 94, 96, 98, 100, 102, 104.

In previous issues the first 21 papers in the "Symposium on Internal Stresses in Metals and Alloys" (Institute of Metals, London, 1948) were reviewed. The next section consisting of nine papers on effects associated with internal stresses on a microscopic and submicroscopic scale is now considered.

4B—Ferrous

4B-67. Effect of Composition on Low Carbon Austenitic Chromium-Nickel Stainless Steels. G. C. Kiefer and C. M. Sheridan. "Yearbook of the American Iron and Steel Institute, 1948", p. 476-499; discussion, p. 500-508.

Previously abstracted from *American Iron and Steel Institute,* preprint, item 3B-86, 1948.

4B-68. Het T.T.T.-diagram. (The T.T.T. Diagram.) F. van Wijk. *Centraal Instituut voor Materiaal Onderzoek Afdeling Metalen,* Feb. 1949, p. 4-9.

Previously abstracted from *Metalen,* item 4b-92, 1948.

4B-69. Grain Size of High-Alloy Austenite as a Factor in Its Heat Resistance. (In Russian.) A. M. Borzdyka. *Izvestiya Akademii Nauk SSSR, Otdelenie Khimicheskikh Nauk* (Bulletin of the Academy of Sciences of the USSR, Section of Chemical Sciences), Mar.-Apr. 1949, p. 121-127.

The influence of grain size of ternary gamma solid solutions of the system Fe-Cr-Ni on their heat-resistant properties. The combined influence of the growth of the austenite grains and of dispersed-carbide formation during secondary heat treatment of solid solutions which are subjected to dispersed hardening (aging).

4B-70. Etude de la siliciuration des cathodes de fer par électrolyse des silicates alcalins fondus. (Study of "Silicification" of Iron Cathodes During the Electrolysis of Fused Alkaline Silicates.) M. P. Blum. *Verres et Réfractaires,* v. 3, Apr. 1949, p. 104-108.

Using a specially developed method, followed by X-ray diffraction investigation. Examination of such X-ray diffraction diagrams shows the presence of a series of definite compounds of iron and silicon: Fe_5Si, FeSi, and $FeSi_2$. The Si content decreases progressively into the interior of the cathode. Its concentration on the surface of the cathode may reach 50%.

4B-71. Das Gefugebild des Meteoreisens. (The Structure of Meteoric Iron). H. Klemm. *Archiv fur Metallkunde,* v. 2, Apr. 1949, p. 132-134.

The Widmannstätten structure,

the Fe-Ni constitution diagram, and the extra-terrestial conditions that influence the microstructures of meteorites.

4B-72. Beitrag zur Kenntnis der Karbide in vanadinlegierten Schnellarbeitsstählen. (Carbides in Vanadium-Alloyed High-Speed Steels.) Helmut Krainer and Roland Mitsche. *Archiv fur das Eisenhuttenwesen,* v. 20, May-June 1949, p. 197-198.

After a brief survey of the literature, the lattice constants of the carbides in four steels alloyed with Cr, Mo, V, and W were determined. 13 ref.

4B-73. Interplanar Spacings of Carbides in Steels. H. J. Goldschmidt. *Metallurgia,* v. 40, June 1949, p. 103-104.

Using either extracted carbides or synthesized materials. For comparison, ferrite, austenite, and the sigma-phase, though not carbides, are also included. The radiation used was cobalt K_α throughout.

4C—Nonferrous

4C-68. Gefugebeobachtungen an Kupfer-Blei-Sinterwerkstoffen. (Observation of the Structures of Sintered Copper-Lead Materials.) G. Lichtenberg-Strunk and H. Wiemer. *Archiv fur Metallkunde,* v. 2, Apr. 1949, p. 141-143.

The structures of Cu-Pb alloys containing 10-50% Pb and sintered in hydrogen at 300-700° C.

4C-69. Sur les équilibres des systemes riches en plomb contenant des métaux alcalins et alcalinoterreux. (Equilibria of Lead-Rich Systems Containing Alkali and Alkaline-Earth Metals.) Léon Jollivet. *Comptes Rendus,* v. 228, May 9, 1949, p. 1495-1497.

The systems Pb-Sb-Na, Pb-As-Na, Pb-Sb-Zn-Na, Pb-Bi-Mg-K, and Pb-Bi-Mg-Ca. Presence of equilibria between solid components not forming a solution with their constituents and the liquid phase where these components are completely dissolved.

4C-70. The X-Ray-Absorption Edges L_I of Tantalum and of Tungsten and L_{II} and L_{III} of Platinum. (In English.) D. Coster and H. De Lang. *Physica,* v. 15, May 1949, p. 351-357.

Experimental results.

4C-71. The System Silver-Magnesium-Tin, With Reference to the Theory of Ternary Alloys. G. V. Raynor and B. R. T. Frost. *Journal of the Institute of Metals,* v. 75, June 1949, p. 777-808.

Examined by microscopic and X-ray methods. Isothermals were established at 550 and 450° C. Results are plotted and discussed in terms of general alloy theory, and it is shown that electrochemical interaction between the solute atoms is of importance in governing general form and certain details of the equilibrium diagram. Influence of the effective size factor in the ternary system on the ranges of homogeneity of the 3/2 electron compounds. 24 ref.

4C-72. A Molybdenum Sigma Phase. H. J. Goldschmidt. *Research,* v. 2, July 1949, p. 343-344.

A compound, FeMo, which is stable only at high temperatures (1180-1540° C.) was found to possess the sigma structure, isomorphous with FeCr. Interplanar spacings of the two sigma phases.

4C-73. Allotropic Transformations in Titanium. A. D. McQuillan. *Nature,* v. 164, July 2, 1949, p. 24.

It has been reported that pure Ti prepared by the dissociation of titanium tetraiodide undergoes an allotropic change in the range 860-900° C. Careful examination indicates that there are two distinct transformations, one at 864 and another at 900° C., and that a third allotropic modification is stable between these temperatures.

4C-74. Concerning the High Pressure Allotropic Modification of Cerium. A. W. Lawson and Ting-Yuan Tang. *Physical Review,* ser. 2 v. 76, July 15, 1949, p. 301-302.

Reviews previous work. Investigation indicates that the high-pressure modification of the initially face-centered lattice stable at atmosphere pressure is also face-centered cubic. 10 ref.

4D—Light Metals

4D-44. Segregation in Aluminium-Copper Alloys. D. E. Adams. *Journal of the Institute of Metals,* v. 75, June 1949, p. 809-838.

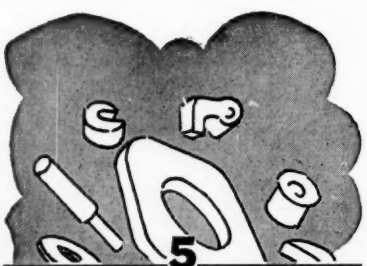
Segregation was measured in a number of ingots containing 3 and 7% Cu, made in such a way that turbulence was avoided and solidification took place in one direction only. Three well defined zones were observed. From results it is concluded that capillary forces are the most important factor influencing interdendritic flow in the feeding of solidification shrinkage; atmospheric pressure, gravitation, and released gases being less important. Methods of minimizing segregation.

4D-45. The Constitution of the Aluminium-Rich Aluminium-Cobalt-Copper Alloys, with Special Reference to the Role of Transitional Metals in Alloy Formation. P. C. L. Pfeil and G. V. Raynor. *Proceedings of the Royal Society,* ser. A, v. 197, June 22, 1949, p. 321-335.

12 ref.

For additional annotations indexed in other sections, see:

2C-42; 3B-152-153; 3D-54; 5B-18; 5C-14-16; 18B-137; 18C-9



5A—General

5A-43. Powder Metallurgy; Survey of Advances Made From Pre-War Practice. H. W. Greenwood. *Metal Industry,* v. 75, July 8, 1949, p. 32-33.

5A-44. (Book) **Powder Metallurgy in Germany During the Period 1939-45.** R. A. Hetzig. H. M. Stationery Office, York House, Kingsway, London, W.C.2, England. (BIOS Overall Report No. 20.) 6d. net.

Essentials of some 250 British and foreign reports dealing with German developments.

5B—Ferrous

5B-17. Electrolytic Production and Properties of Iron Powder. (In Russian.) L. L. Kuzmin and V. L. Kiseleva. *Zhurnal Prikladnoi Khimii* (Journal of Applied Chemistry), v. 22, Mar. 1949, p. 311-318.

The production method was studied, with emphasis on the following factors: content of $FeSO_4 \cdot 7H_2O$, pH of solution, cathode current density, and temperature. On the basis of the results optimum conditions were established. 12 ref.

5B-18. Verbesserung der mechanischen Eigenschaften von Sinterweicheisen durch Sauerstoffbehandlung. (Improving the Mechanical Properties of Sintered Soft Iron by Treatment with Oxygen.) H. Wiemer and R. Hanebuth. *Archiv fur Metallkunde,* v. 2, Apr. 1949, p. 129-132.

Details of experimental work as applied to sintered bodies of different densities and produced from different Fe powders.

5B-19. Magnetic Properties of Iron Compacts in Relation to Sintering Temperature. Robert Steinitz. *Journal of Applied Physics,* v. 20, July 1949, p. 712-714.

The permeability of five different iron powders was shown to be independent of the origin of the powder, if the compacts were sintered at the same temperature. Results were compared with the theory of Polder and Van Santen and agreed very well, if the residual pores were assumed to be flat disks. Compared for identical densities, the permeability of different iron powders is appreciably higher if sintering is done at 1250-1350° C. and for 24 hours, instead of at 1150° C. for one hour. Coining after high-temperature sintering brings the permeability values back to the curve of the disk-shaped flat pores. The temperature effect, therefore, must be attributed to a change in pore shape.

5C—Nonferrous

5C-14. Das Verhalten von gepressten Silberpulvern beim Sintern. (The Behavior of Pressed Silver Powders During Sintering.) Ernst Raub and Werner Plate. *Zeitschrift fur Metallkunde,* v. 40, May 1949, p. 171-175.

The thermal expansion, electrical resistance, and structure were investigated over a range of sintering temperatures. These properties were correlated with the tendency of silver to cold welding. The effect of additions on the thermal expansion of pressed and sintered silver powder.

5C-15. The Control of Properties of Sintered Hard Metals. E. J. Sandford. *Alloy Metals Review,* v. 7, June 1949, p. 2-12.

How the properties of sintered hard metals are obtained and how they can be modified by alterations in manufacturing technique. Other topics discussed are choice of carbides, influence of cobalt content, use of binders other than cobalt, and influence of grain size.

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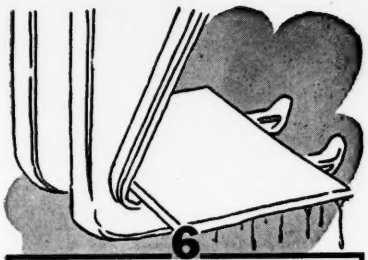

6 CORROSION

6A—General

6A-87. Korrosion. (Corrosion.) R. Ergang, G. Masing, G. Wassermann, and W. Wiederholt. "Allegemeine Metallurgie" (Office of Military Government for Germany), 1948, p. 257-281.

Reviews German literature for 1939-46. Separate sections deal with theory of corrosion (Ergang and Masing); stress corrosion (Wassermann); and corrosion testing (Wiederholt). 143 ref.

6A-88. Corrosion of Metals Under Lacquer Films and Electrochemical Methods of Investigation of Protective Properties of Lacquer Coatings. (In Russian.) N. D. Tomashov, V. S. Kiselev, and M. M. Gol'dberg. *Izvestiya Akademii Nauk SSSR, Otdelenie Khimicheskikh Nauk* (Bulletin of the Academy of Sciences of the USSR, Section of Chemical Sciences), Mar.-Apr. 1949, p. 152-163.

Basic laws of the above corrosion process. On the basis of the results, an electrochemical method of investigation is proposed. 17 ref.

6A-89. Sparbeizen. (Inhibitors.) *Metalloberfläche,* v. 3, June 1949, p. A125.

Preparation of some corrosion inhibitors said to be especially effective. Full details necessary to prepare these mixtures.

6A-90. Focus on Materials and Design to Stop Corrosion. *SAE Journal,* v. 57, July 1949, p. 60-61, 64.

Based on "Corrosion Problems of the Automotive Engineer" by F. L. LaQue and E. L. Hergenroether; "Corrosion of Electroplated Steel in Automotive Applications", by H. A. Pray; and "Service Tests Solve Aluminum Cylinder Head Corrosion Problems", by M. W. Daugherty and R. F. Koenig; also accompanying discussion. (Individual papers were previously abstracted from preprints), items 6A-64, 6B-92 and 6D-21, 1949.

6A-91. Joint Cathodic Protection Systems. *Pipe Line News,* July 1949, p. 16-18.

Reprint of a bulletin prepared by the Correlating Committee on Cathodic Protection.

6A-92. Britain's Combat With Corrosion. Wilfred F. Coxon. *Metal Progress,* v. 56, July 1949, p. 79-80.

Work of corrosion section of Britain's Chemical Research Laboratory on a variety of corrosion problems during the war.

6A-93. Sur quelques aspects des réactions entre une phase solide et une phase liquide ou gazeuse. (Certain Aspects of Reactions Between a Solid Phase and a Liquid or Gaseous Phase.) M. F. Trombe. *Bulletin de la Société Chimique de France,* Mar.-Apr. 1949, p. D213-D217.

The importance, from the practical point of view, of the ratio between the volume of solid products which may exist in the initial and final steps of a reaction. Depending on the value of this ratio, that is above or below unity, the solid phase formed protects or does not protect the initial phase. Application of this theory to oxidation of metals, to the attack of silica on aluminum, and in general to the protection of metals by oxide films.

6A-94. Marine Corrosion Tests Show Practical Results. George Weber. *Oil and Gas Journal,* v. 48, July 28, 1949, p. 236-237, 334.

Facilities and research work at Kure Beach, N. C., maintained jointly by International Nickel and Dow Chemical Companies. Use of Mg and Zn anodes for cathodic protection.

6A-95. Automotive Corrosion Clinic, *SAE Journal,* v. 57, Aug. 1949, p. 29-37. Based on "Corrosion Problems of the Automotive Engineer", F. L. LaQue and E. J. Hergenroether; "Corrosion of Electroplated Steel in Automotive Applications," H. A. Pray; and "Service Tests Solve Aluminum Cylinder Head Corrosion Problems", M. W. Daugherty and R. F. Koenig; also accompanying discussion.

Topics covered are: body-steel, engine-cylinder, cylinder-liner, muffler, and tailpipe corrosion. (LaQue and Hergenroether); corrosion of electroplated steel (Pray); cause of Al cylinder-head corrosion (discussion by D. H. Green), and remedy for the latter (Daugherty and Koenig). Papers were previously abstracted from *Society of Automotive Engineers,* Preprints, 1949. Items 6A-64, 6B-92, 1949.

6A-96. Procedures Outlined for Cathodic Protection Minimum Current Data Experiments. A. V. Smith. *Corrosion,* v. 5, Aug. 1949, p. xi.

Questionnaire failed to provide satisfactory information concerning minimum currents necessary for cathodic protection. Hence an outline of proposed experiments for determining these currents is presented. Details of methods will be planned by a subcommittee. Assistance in carrying out the experiments will be solicited.

6A-97. The Pulse Polarizer in Corrosion Technology. Hugh J. McDonald and Glenn A. Marsh. *Corrosion,* v. 5, Aug. 1949, p. 254-260.

Instrument and its present and potential uses in study of corrosion and electrochemistry in general. It consists essentially of a high-voltage d.c. source, a pulse-discharge mechanism, a sensitive polarization detector, and a high-speed strip-chart recorder. A high-voltage condenser is discharged across a cell and the potential of the electrode, (which may be the metal whose corrosion rate is desired) is measured against a standard reference electrode. Applications to the study of corrosion inhibitors, to choice of a metal for use in a particular environment, to alloy identification, and to choice of a stress-corrosion inhibitor. For certain corrosion reactions under cathodic control, data obtained may be used to quantitatively predict corrosion rates. 15 ref.

6A-98. Corrosion. Mars G. Fontana. *Industrial and Engineering Chemistry,* v. 41, Aug. 1949, p. 77A-78A.

Results of tests on CF-8 and titanium in HNO_3 at high temperatures and pressures. CF-8 is the Alloy Casting Institute's designation for the 18-8S type alloy.

6A-99. Testing Station a Valuable Source of Corrosion Data. *Machinery,* v. 55, Aug. 1949, p. 170.

Corrosion-testing station at Kure Beach. N. C.

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6A-100. (Book) **Cathodic Protection—A Symposium.** 203 pages. 1949. National Assoc. of Corrosion Engineers, Houston, Tex. $8.00 ($6.00 to members of NACE or Electrochemical Society.)

Consists of 23 papers given in Dec. 1947, in Pittsburgh. They provide information on the state of development of the basic principles of cathodic protection and on their application to the control of corrosion.

6B—Ferrous

6B-116. Corrosion Protection for Tanks by Reinforced Gunite Linings. *Petroleum Processing,* v. 4, July 1949, p. 784-788.

Reinforcing with steel mesh in the application of guniting has proved to be successful for protecting storage tanks from corrosion, and overcoming spalling which occurred when a thinner, non-reinforced gunite lining was used. Details of installation.

6B-117. How to Select Anode Materials for Cathodic Protection Against Corrosion. N. Bruce Bagger. *Materials & Methods,* v. 30, July 1949, p. 47-49.

General factors involved, and the specific materials magnesium, aluminum, steel, and iron.

6B-118. High-Duty Silicon Iron; Components of Resistant Chemical Equipment. R. V. Riley. *Chemical Age,* v. 61, July 2, 1949, p. 21.

Corrosion-resistant properties; foundry technique; testing; and applications.

6B-119. Protection Methods for Cast Iron and Steel Pipes. J. E. Carriere. *Gas Journal,* v. 259, July 6, 1949, p. 96-97; discussion, p. 97-99.

Reviews communication No. 13 of the Central Corrosion Committees of the Netherlands. Light, reinforced, heavy, and very heavy external protection.

6B-120. The Economics of Oil-Well Corrosion Control. Robert J. Villagrana and William W. Messick. *Oil and Gas Journal,* v. 48, July 21, 1949, p. 58-61, 92-94.

Technology and economic factors. Indicators which may be used to predict corrosiveness. Types of well corrosion, effects of stray currents, cost evaluation, corrosion-mitigation methods and maintenance of a corrosion-control program.

6B-121. Isotherms at 100° C. of the System: MnO-P_2O_5-H_2O. (In Russian.) S. S. Taperova and M. M. Isaeva. *Zhurnal Prikladnoi Khimii,* (Journal of Applied Chemistry), v. 22, Apr. 1949, p. 342-353.

Investigated because of its importance in connection with phosphating for corrosion protection of ferrous metal. 30 ref.

6B-122. Sodium Nitrite as an Inhibitor Against the Attack of Sea Water on Steel. Part I. The Influence of Sodium Nitrite on the Area and Intensity of Attack. D. Wyllie and G. C. N. Cheesman. *Journal of the Society of Chemical Industry,* v. 68, June 1949, p. 165-168.

The above was studied by observation of the extent and nature of corrosion of mild-steel specimens partially immersed in sea water containing nitrite and by measurement of the corrosion currents using a divided cell. Appearance of a widespread brown discoloration at higher nitrate concentrations and a catalytic mechanism for the inhibiting action of nitrite. Effect of mixing phosphates and nitrite.

6B-123. The Practical Problems of Corrosion. Part XII. The Influence of Corrosion on the Thermal Deposition of Calcium Carbonate. J. N. Wanklyn and U. R. Evans. *Journal of the Society of Chemical Industry,* v. 68, June 1949, p. 171-173.

Steel specimens partly immersed in calcium bicarbonate solution develop a white band of calcium carbonate along the waterline. When more deeply immersed, the distribution of the $CaCo_3$ deposited is almost unrelated to that of the $CaCo_3$ produced in the previous corrosion stage. The corrosion product contained calcite and aragonite, and the thermal deposit only aragonite.

6B-124. Hydrogen Blistering of Steel; A Source of Damage to Vessels. M. H. Bartz and C. E. Rawlins. *Petroleum Processing,* v. 4, Aug. 1949, p. 898-901, 904-906.

The cause of blistering of vessel walls and other refinery equipment was found to be the attack of atomic hydrogen released by acid corrosion. This same condition may lead to embrittlement particularly at high temperatures. Use of corrosion-resistant linings is recommended as one means of controlling hydrogen blistering. Case histories from various refineries. 20 ref.

6B-125. Practical Corrosion Control on Gas Transmission Lines. G. R. Olson and H. V. Beezley. *Corrosion,* v. 5, Aug. 1949, p. 249-253.

Emphasis on the various forms of cathodic protection and on selection of type of current source. Importance of insulating couplings.

6B-126. Application of Alloy Steel Linings to Tanks Storing Corrosive Pulp Cooking Liquor. H. A. Schmitz and M. A. Scheil. *Corrosion,* v. 5, Aug. 1949, p. 271.

Test results. Types 347 and 316 low-carbon alloys were found to have considerable advantage over other materials tested.

6B-127. Field and Laboratory Tests of Sodium Chromates and Alkalies for Controlling Corrosion in Gas Condensate Wells. Part II. Theoretical Considerations. C. K. Eilerts, R. V. Smith, F. G. Archer, L. M. Burman, Faye Greene, and H. C. Hamontre. *World Oil,* v. 129, Aug. 1949, p. 173-174, 176, 177-178, 182.

The pH of compound found in well water, molecular forms of chromates, reduction of chromates, and test results. 28 ref.

6B-128. Kinetics of the Corrosion Process in Condensate Gas Wells. Norman Hackerman and Harold R. Schmidt. *Industrial and Engineering Chemistry,* v. 41, Aug. 1949, p. 1712-1716.

Rate curves for the corrosion of SAE 1020 steel in a number of natural gas-condensate wells were obtained for relatively long periods of time. Surfaces were examined microscopically and composition of the corrosion products was determined by X-ray and diffraction methods.

6B-129. Identification of Corrosion Products Using Measurements of Film Thickness and Mass. C. Kenneth Eilerts. *Industrial and Engineering Chemistry,* v. 41, Aug. 1949, p. 1716-1717.

The data of Hackerman and Schmidt (see above abstract) suggest that products of corrosion may be partially identified by the density of the surface layers. Data calculated indicate close agreement between measured values of corrosion-product density and the literature values for products identified by X-ray analysis.

6B-130. Use of Neutralizing Agents for Condensate-Well Corrosion Control. D. A. Shock. *Oil and Gas Journal,* v. 48, Aug. 11, 1949, p. 77-80.

Apparatus for pH determination in H_2CO_3 solutions. Test results showed that pH could be maintained above 5.5 by addition of neutralizing agents, even in the presence of large CO_2 excesses. Use of Mg metal was found to reduce attack of CH_3COOH and H_2CO_3 on steel. Injection of NO_2CO_3 into a corrosive well was shown to keep the water above pH 6.0 at well-head conditions. Corrosion of the tubing thus protected was negligible.

6B-131. Corrosion Protection of Oil-Refining Equipment. Henry P. Zeh. *Oil and Gas Journal,* v. 48, Aug. 11, 1949, p. 99-100, 103.

How to prepare condensed records of corrosion experience, how to determine corrosion rates by use of "reference points" consisting of noncorroding alloy blocks installed in fixed positions close to the surfaces being studied. Use of pilot-plant corrosion tests.

6C—Nonferrous

6C-47. The Oxidation of Copper and the Reactions of Hydrogen and Carbon Monoxide with Copper Oxide. W. E. Garner, T. J. Gray, and F. S. Stone. *Proceedings of The Royal Society,* ser. A, v. 197, June 22, 1949, p. 294-314.

Investigation made of the activation of Cu. Heats of adsorption of CO and O_2 and heat liberated during the catalytic reaction on a cuprous oxide film formed on Cu were measured at room temperature and the kinetics of the reactions were studied. Electrical conductivity of thin films of oxides during reduction and the process of embrittlement. Effect of adsorption of gases on surface conductivity. 20 ref.

6C-48. Oxidation-Resistance of High Melting Point Alloys. O. Kubaschewski and A. Schneider. *Canadian Metals and Metallurgical Industries,* v. 12, July 1949, p. 16-17, 22-23, 26, 28.

Previously abstracted from *Journal of the Institute of Metals.*

6C-49. Resistance of Monel, Nickel and High-Nickel Alloys to Corrosion by Sulfuric Acid. *International Nickel Co.,* Technical Bulletin T-3, Oct. 1948, 44 pages.

The performance in sulfuric acid solutions was determined by service experience and numerous laboratory and plant corrosion tests. 22 ref.

6C-50. La reduction des films minces d'oxyde de Cuivre. (Reduction of Thin Films of Copper Oxide.) W. E. Garner, T. J. Gray, and F. S. Stone. *Bulletin de la Société Chimique de France,* Mar.-Apr. 1949, p. D177-D182.

Copper oxide films were prepared by alternate oxidation and reduction. Changes taking place were followed by variation in gas pressure and electrical resistance, and by microscopic examination. Kinetics of the reaction were studied on the basis of heats of adsorption determined for O_2, CO, H_2, and CO_2.

6C-51. Structure et croissance des pellicules anodiques sur l'Aluminium et le Zinc. (Structure and Growth of Anodic Films on Aluminum and Zinc.) M. K. Huber. *Bulletin de la Société Chimique de France,* Mar.-Apr. 1949, p. D183-D188.

Investigation revealed the existence of two types of anodic film on each of the above metals, a very dense film restricting the passage of the electrical current, and a porous film. The crystallographic structure of porous films and their optical properties seem to be related to the crystal structure of the metal substrate. 17 ref.

6C-52. Chemical Properties of the Intermetallic Compounds Mg_2Sn and Mg_2Pb. W. D. Robertson and H. H. Uhlig. *Journal of the Electrochemical Society,* v. 96, July 1949, p. 27-42.

Study of physical and chemical properties of the compounds undertaken to provide data concerning constitution, and also to provide a more complete understanding of corrosion mechanisms in alloys. Chemical properties reported include: oxidation rates at high and low temperatures, galvanic potentials, rates of reaction in inorganic electrolytes, and a previously unreported form of crystallographic disintegration, occurring in distilled water and having a possible relation to stress-corrosion cracking. 15 ref.

6C-53. Comparative Corrosion Resistance of Some Copper Alloy Condenser Tubes. John R. Freeman, Jr., and A. W. Tracy. *Corrosion,* v. 5, Aug. 1949, p. 245-248.

Results of experiments at a water-flow rate of 11.7 ft. per sec. show the marked superiority of the cupro-nickel alloys containing iron in resisting the rather extreme conditions of test. The effect of only 0.75% Fe in the 10% cupro-nickel alloy is particularly significant. This new alloy is also shown to be superior to 8%-Sn bronze.

6C-54. Physical and Corrosion Characteristics of Lead in the Chemical Industry. Kempton H. Roll. *Corrosion,* v. 5, Aug. 1949, p. 261-270; discussion, p. 270.

Based on information in the files of the Lead Industries Association. Amenability to various fabrication methods; applications. 18 ref.

6C-55. Titanium and Zirconium Corrosion Studies; Common Mineral Acids. E. A. Gee, L. B. Golden, and W. E. Lusby, Jr. *Industrial and Engineering Chemistry,* v. 41, Aug. 1949, p. 1668-1673.

Apparatus used and results obtained when Ti and Zr were exposed to the corrosive actions of H_2SO_4, HCl, and HNO_3 at different temperatures. Ti is resistant to H_2SO_4 and HCl only at low concentrations but is almost completely resistant to all concentrations of HNO_3. Its general behavior is comparable to Type 316 stainless steel. Zr is relatively resistant to all concentrations of HCl, HNO_3, and H_3PO_4, although it is attacked by high concentrations of H_2SO_4 at elevated temperatures. 10 ref.

6D—Light Metals

6D-25. Uber das Spannungskorrosionsverhalten von Hy 43- und Igedur-Pressstreifen mit verschiedenen Zusäzen. (Concerning the Stress-Corrosion Behavior of Pressed Strips of Hy 43 and Igedur with Different Additions.) Gustav Siebel. *Zeitschrift fur Metallkunde,* v. 40, May 1949, p. 162-166.

The effects of Cu, Mn, Cr, V, and Ti, and of an annealing treatment, on the strength properties and stress-corrosion resistance of an Al-Zn-Mg alloy and the effect of Mn, Cr, and Ti on the same properties of an Al-Cu-Mg alloy.

6D-26. The Rate of Solution of High Purity Aluminum in Various Bases. M. E. Straumanis. *Journal of the Electrochemical Society,* v. 96, July 1949, p. 21-26.

Series of dissolution experiments of high purity Al (99.998% in KOH, $Ba(OH)_2$, $Sr(OH)_2$, $Ca(OH)_2$, $Mg(OH)_2$, and NH_4OH solutions of different concentrations. 25 ref.

For additional annotations indexed in other sections, see:
3B-157; 6C-52

7 CLEANING and FINISHING

7A—General

7A-113. Metallrengöring. (Metal Cleaning). *Finish* (Sweden), v. 6, Feb. 1949, p. 33-36, 38, 46; Mar. 1949, p. 55-58, 60.

Cleaning of metals by electrolysis, alkalies, solvents, emulsions, and petroleum derivatives, by etching with acids and electrolytically, and by mechanical methods.

7A-114. Uber die Grösse und Verteilung der reagierenden Stellen, "Störstellen" bzw. "aktiven Stellen" an Metalloberflächen. (On the Size and Distribution of Reacting Patterns, Interference Patterns, or "Active" Patterns on Metal Surfaces.) Otto Erbacher. *Zeitschrift fur Elektrochemie und angewandte physikalische Chemie,* v. 53, Mar. 1949, p. 54-67.

Conclusions based on previously determined data on the electrochemical and adsorptive behavior of metal surfaces. Effects of solvents on sheet metals. 13 ref.

7A-115. Uber die Wirksamkeit der Oberflächenatome, "Störstellen" bzw. "aktiven Stellen" an Metalloberflächen. (On the Effect of Surface Atoms, Interference Patterns, and "Active" Patterns on Metal Surfaces.) Otto Erbacher. *Zeitschrift fur Elektrochemie und angewandte physikalische Chemie,* v. 53, Mar. 1949, p. 67-75.

Results of several series of experiments made to study the adsorption of metal ions, the process of solution, and electrochemical exchange at metal surfaces. Basic differences between adsorption on platinum and on other metals. 14 ref.

7A-116. Poren- u. Schichtdickenbestimmung leitender u. nichtleitender Schutzuberzuge. (Determining the Porosity and Thickness of Conducting and Nonconducting Protective Coatings.) A. Vollmer. *Archiv fur Metallkunde,* v. 2, Apr. 1949, p. 145-147.

Several methods.

7A-117. Developments in High Temperature Ceramics on Metals. Richard P. Harner. *Steel Processing,* v. 35, June 1949, p. 294-295, 330.

Development of a product designated as L625-2056, which largely superseded the National Bureau of Standards A-19 coating developed in 1944. Superior heat-resistant properties of the product and miscellaneous aircraft and automotive applications.

7A-118. Untersuchungen uber die Absorptionseigenschaften von Farbanstrichen und den Erwärmungsvorgang bei Strahlungstrocknung. (Research on the Absorption Properties of Coats of Paint and the Heating Process in Radiation Drying.) Carl August Landfermann. *Metalloberfläche,* v. 3, June 1949, p. A126-A130.

Regardless of wave length — in most drying operations by radiation, the impermeability of the respective materials is based on absorption. However, if the material to be dried is fairly transparent, the longer wave lengths give better results.

7A-119. Finishing Fluorescent Lighting Fixtures. Robert Weber. *Industrial Finishing,* v. 25, July 1949, p. 30-32.

Cleaning, spraying, baking setup for metal fixtures. Advantage of applying hot synthetic enamel.

7A-120. Vinyls for Metal Decorating. R. A. Calsibet. *American Ink Maker,* v. 27, July 1949, p. 33-34, 59.

Including technical and economic factors.

7A-121. New Developments in Vinyl Coatings for Metal Decorating. R. A. Calsibet. *Modern Lithography,* v. 17, July 1949, p. 36-38.

Compositions, properties, and applications.

7A-122. How To Select Sprayed Metals. John E. Wakefield. *American Machinist,* v. 93, July 28, 1949, p. 80-82.

Previously abstracted from *Metal Progress,* item 7a-260, 1948.

7A-123. Porcelain Enamel as a Protective Finish. H. D. McLaren. *Enamelist,* v. 26, Summer 1949, p. 8-13.

Composition and manufacture of porcelain enamels; application of enamel to metal; new developments; properties of porcelain enamel coatings; uses of porcelain enamel; and ceramic coatings for high-temperature applications. Article is intended primarily for sales personnel.

7A-124. Porcelain Enamel and Organic Finishes. Karl Schreiber. *Enamelist,* v. 26, Summer 1949, p. 22-25.

Comparative properties of four resinous finishes and of porcelain enamel.

7A-125. Electrostatic Glazing. Thomas A. Dickinson. *Ceramic Age,* v. 54, July 1949, p. 28-29.

Equipment and procedures for glazing metallic and nonmetallic surfaces with ceramic and organic coatings.

7A-126. Tank Linings; Principal Materials Used for Corrosive Conditions. V. Evans. *Metal Industry,* v. 75, July 29, 1949, p. 86-88.

Previously abstracted from *Journal of the Electrodepositors' Technical Society,* item 7A-111, 1949. (To be concluded.)

7A-127. Industrial Finishes and Finishing. F. G. Weed and N. P. Beckwith. *Paint and Varnish Production Manager,* v. 29, Aug. 1949, p. 208-213.

Materials and methods employed in the protective and decorative coating of common industrial products.

7A-128. Unit Operations in Name Plate Manufacture. Robert I. Shore. *Products Finishing,* v. 13, Aug. 1949, p. 18-24.

Procedures and equipment of drawn, formed, and embossed metal nameplates for the automotive, refrigerator, radio, stove, and other industries.

7A-129. Production Clinic for Finishing Die Castings. *Die Castings,* v. 7, Aug. 1949, p. 37-38.

Measuring of paint film thickness on nonmagnetic metals.

7A-130. Specification and Application of Wrinkle Finishes. William A. Waldie. *Electrical Manufacturing,* v. 44, Aug. 1949, p. 106-111, 178.

Special properties and methods of application from the standpoint of the original equipment designer. Various applications.

7A-131. How to Do Buffing and Polishing. Jerome L. Bleiweis. *American Machinist,* v. 93, Aug. 11, 1949, p. 105-112.

Details of equipment and procedures, including a discussion of the relative merits of hand or automatic polishing.

7B—Ferrous

7B-144. Continuous Coating. Forrest M. Morrow and K. Oganowski. "Yearbook of the American Iron and Steel Institute, 1948", p. 577-594; discussion, p. 594-601.

Previously abstracted from *Industrial Heating,* item 7b-158, 1948.

7B-145. Continuous Strip Pickling. E. D. Martin. "Yearbook of the American Iron and Steel Institute, 1948", p. 602-654; discussion, p. 654-666.

Previously abstracted from *American Iron and Steel Institute,* preprint, item 7B-116, 1948.

7B-146. Elektrometallisering med zink—exempel pa sprutförzinkning av stora järnkonstruktioner. (Electrogalvanizing—An Example of Spray-Zinc Coating of Large Iron Structures.) Bo Löfgren. *Finish* (Sweden), v. 6, Mar. 1949, p. 49-51.

A method of protecting steel ship hulls, etc., from corrosion.

7B-147. Die Auswirkung von Titan im Eisen beim Feuerverzinken. (The Effect of Titanium in Iron on Hot-Galvanizing.) Heinz Bablik, Franz Götzl, and Rudolf Kubaczka. *Zeitschrift fur Metallkunde,* v. 40, May 1949, p. 176-179.

The differential effects of Si and Ti in Fe on the Fe-Zn reaction. About 0.7% Si in Fe multiplies the reaction about 10 times, while Ti fails to increase its rate. Other effects of Ti in Fe.

7B-148. How Kelvinator Refrigerators Are Enameled White. John C. Pietrzyk. *Industrial Finishing,* v. 25, July 1949, p. 22-24, 26, 28.

Cleaning, rustproofing, etching, coating, and baking procedures.

7B-149. Metallizing in Relation to Marine Engineering. *Welding Journal,* v. 28, July 1949, p. 659-669.

Extensive discussion of paper by J. Barrington Stiles (June issue). Author's replies to the various comments.

7B-150. Metallizing: How They Put It to Work in Chemical Plants. J. E. Wakefield. *Chemical Engineering,* v. 56, July 1949, p. 96-97.

Surfacing cast iron rolls with stainless, tin-coating alcohol tanks, and restoring plug cocks.

7B-151. Trouble Shootin'. John L. McLaughlin. *Better Enameling,* v. 20, July 1949, p. 16-17.

Defects known as "poppers"; eggshell, mat, or pimply appearance; and orange peel. Remedies.

7B-152. Body Finishing; "Rotodip" and "Rotospray" Plants at Morris Motors Ltd., Cowley. *Automobile Engineer,* v. 39, July 1949, p. 271-272.

Process sequence.

7B-153. Production Drying of Finishes Accomplished With Infra-Red Ovens. J. A. Martin. *Materials & Methods,* v. 30, July 1949, p. 68-70.

7B-154. Rustproofing and Painting Morris Bodies. *Machinery* (London), v. 75, July 14, 1949, p. 54-56.

Finishing line for British car.

7B-155. High Speed Buffing. A. H. Allen. *Steel,* v. 125, July 18, 1949, p. 89-90.

Special unit which processes 73,000 screw heads per hour. The buffing is an essential preliminary to a plating operation.

7B-156. Continuous Galvanizing of Strip Steel. H. W. Lynn. *Iron Age,* v. 164, July 21, 1949, p. 96-100.

Advantages of Zn coating strip steel by a continuous operation. Preliminary operations on a Weirton installation.

7B-157. Paint for Oil Duct Systems for Steam Turbines. (In Russian.) E. V. Iskra and V. I. Volkov. *Kotloturbostroenie* (Boiler and Turbine Manufacture), Mar.-Apr. 1949, p. 30-32.

Different paints and lacquers were investigated. Method of testing. Best paint for exposure to oil-containing moisture. Chemical and physical properties of this paint. 20 ref.

7B-158. Formation of Residual Stresses During Polishing of High-Chromium Stainless Steel. (In Russian.) L. A. Glikman, T. P. Sanfirova, and V. A. Stepanov. *Zhurnal Tekhnicheskoi Fiziki* (Journal of Technical Physics), v. 19, Apr. 1949, p. 441-447.

Experimental investigation showed that stresses formed during polishing have a thermal origin which may be influenced by volumetric variation related, probably, to phase transformations, in certain cases. Similar phenomena occurred during polishing of a stainless-steel plate for which the diagram of residual stresses differed essentially from the usual diagram.

7B-159. Clad Steel. F. R. Pattison. *Journal of the Birmingham Metallurgical Society,* v. 29, June 1949, p. 86-102; discussion p. 103-110.

Previously abstracted from *Iron and Steel,* item 7B-126, 1949.

7B-160. Drawing Compounds and Other Variables in the Rinsing of Metal Cleaners. Louis A. Pavlish. *Enamelist,* v. 26, Summer 1949, p. 3-7.

The rinsing process between the cleaning of steel and its immersion into the H_2SO_4 pickle has been given little consideration in the preparation of steel for porcelain enameling. A modification of the regular pickling procedure was used to determine the effects of various rinsing variables: addition of drawing compound to cleaner; carry-over of cleaner to rinse; flanged parts; transfer time between cleaner and rinse; and temperature of rinse.

7B-161. Finishing Trailers in Zinc. *Organic Finishing,* v. 10, July 1949, p. 19-20.

Application of "zincilate", a self-protecting Zn coating applied to scale-free metal surfaces by brush, spray gun, or dipping.

7B-162. New Exterior Paints for H. M. Ships. *Paint Manufacture,* v. 19, July 1949, p. 236-238.

Work done in applying modern synthetic-resin paints to ships of the British Navy.

7B-163. Protective Coatings. G. E. Seidel. *Steel Processing,* v. 35, July 1949, p. 368-370.

Procedures for surface preparation and application of the coatings for steel structures exposed to water, alkali, salt, and petroleum.

7B-164. Protective Coating Prevents Slag on Boiler Heating Surfaces. E. F. Walsh. *Power Generation,* v. 53, July 1949, p. 74-75.

Internal surfaces exposed to gas are cleaned and then coated with lime slurry. Principles and results of treatment on several boilers.

7B-165. Production of Hot and Cold-Rolled Strip and Sheets. Parts VII and VIII. Charles L. McGranahan. *Steel,* v. 125, July 18, 1949, p. 91-92, 94, 96, 98, 101; July 25, 1949, p. 80, 82, 84, 87-88, 90.

Part VII deals with hot-dip and electrolytic galvanizing and surface-preparation procedures and equipment. Satisfactory coating thicknesses for various uses. The final section discusses electrolytic galvanizing lines, formed steel products including corrugated roofing and siding, and methods used for the hot rolling and finishing of stainless and heat resistant steel sheets and strip.

7B-166. Thin Stampings Deburred Without Bending. *Steel,* v. 125, July 25, 1949, p. 75.

A "self" tumbling process for soft steel stampings which uses the abrasive action of the pieces rubbing on each other, plus a small amount of fine abrasive.

7B-167. Steel in "Glass" Clothing. *Esso Oilways,* v. 16, Aug. 1949, p. 14-20.

Methods used to make a variety of products including porcelain-coated-steel wall covering.

7B-168. This Plant is Built to Design, Fabricate and Finish Sheet Steel Signs. H. H. Wineburgh and J. E. Bourland. *Finish,* v. 6, Aug. 1949, p. 19-22, 66, 68.

Plant, equipment and procedures.

7B-169. How to Prevent Defects in Porcelain Enameling Holloware. Part X. Ground Coat Defects. F. A. Petersen. *Ceramic Industry,* v. 53, Aug. 1949, p. 61, 84, 86.

Recommendations applicable to adherence, fishscale, copperheads, and burnoff.

7B-170. Production of Tin Plate. Alfred E. Kadell. *Steel,* v. 125, Aug. 1, 1949, p. 82-84, 86, 88; Aug. 8, 1949, p. 84, 86, 89-90, 92; Aug. 15, 1949, p. 114, 116, 118, 121-122, 124.

The two processes in commercial use for the above (hot-dip and electrolytic tinning), including preliminary and succeeding operations. Part I describes precleaning procedures, coiling, annealing, and temper rolling. Part II takes up the next operation—tinning itself—and describes the hot-dip method. Also covers following operations, including inspection and packing. Part III describes the alkaline and the acid processes, both in current use for electrodepositing tin on steel sheets.

7D—Light Metals

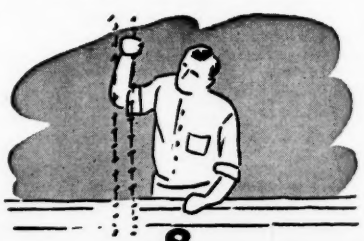
7D-37. Surface Finishing and Protection of Magnesium Alloys. H. K. DeLong. *Modern Metals,* v. 5, July 1949, p. 26-29.

Methods including surface conversion coatings by chemical dipping and anodic oxidation, painting, and electroplating.

7D-38. Finishing Treatments for Magnesium. Jerome L. Bleiweis. *American Machinist,* v. 93, July 28, 1949, p. 119.

Sealed chrome-pickle process and anodic treatment.

For additional annotations indexed in other sections, see:
15-56; 19B-142-154; 21C-4



8
ELECTRODEPOSITION and ELECTROFINISHING

8-203. Dispersed Deposition of Metals at High Current Densities. (In Russian.) M. Loshkarev, A. Ozerov, and N. Kudryavtsev. *Zhurnal Prikladnoi Khimii (Journal of Applied Chemistry),* v. 22, Mar. 1949, p. 294-306.

A theory for the mechanism of

the influence of diffusion processes on the structure of the cathode deposit. It is shown that, during electrolysis with above currents, deposition should take place in dispersed form. 17 ref.

8-204. Trumapparater kontra klockapparater. (The Rotating Versus the Rocking Electroplating Barrel.) S. V. Ekström. *Finish* (Sweden), v. 6, Mar. 1949, p. 64-66.

Relative efficiency and utility.

8-205. Uber die Hartverchromung mit uberlagertem hochfrequentem Wechselstrom, (Hard Chromium Plating With Superimposed High-Frequency Alternating Current.) Fr. Muller, W. Eilender, and K. M. Wagner. *Archiv fur Metallkunde,* v. 2, Apr. 1949, p. 135-140.

Two different laboratories investigated independently the claims of the inventor of the Hausner process.

8-206. Die Rolle der Gefuge Bestandteile bei der anodischen Oxydation von Aluminiumlegierungen. (The Role of the Structural Constituents in the Anodic Oxidation of Aluminum Alloys.) Hellmut Fischer. *Metalloberfläche,* v. 3, June 1949, p. A117-A125.

The nature of the reaction of impurities with alloying constituents and the properties of the resulting anodic oxide films. Various constituents undergo a topochemical reaction. Structures of the oxide layers.

8-207. Uberprufung der Methoden zur Ausfällung von Zink aus Nickelbädern. (On the Rochelle Salt-Copper Bath.) Richard Erdmann. *Metalloberfläche,* v. 3, June 1949, p. B38-B39.

Advantages and methods of using Rochelle salt for electrodeposition of copper.

8-208. Copper Plating From Straight Cyanide Electrolytes. E. E. Halls. *Sheet Metal Industries,* v. 26, July 1949, p. 1505-1508.

Bath compositions used for copper plating and results of experiments on straight cyanide electrolytes varying primarily with respect to free-cyanide content. Working temperatures up to 50° C., and current densities up to 20 amp. per sq. ft. were covered.

8-209. Practical Points on Nickel Plating. Robert L. Buckley. *Electroplating and Metal Finishing,* v. 2, July 1949, p. 467-471.

Types and characteristics of solutions, maintenance and control of Ni solutions, pH control, and specification of thickness.

8-210. ETS Visit Ford at Dagenham. *Metal Industry,* v. 75, July 1, 1949, p. 7-9, 13.

Members of the Electrodepositors' Technical Society visit electroplating division. Equipment and procedures.

8-211. Rinsing. I. With Single-Compartment Tank. Joseph B. Kushner. *Plating,* v. 36, Aug. 1949, p. 798-801, 866.

A mathematical treatment on the control of the amount of rinse water to obtain good plating at lowest overall cost.

8-212. Calculation of Stress in Electrodeposits From the Curvature of a Plated Strip. Abner Brenner and Seymour Senderoff. *Plating,* v. 36, Aug. 1949, p. 810-816.

Previously abstracted from *Journal of Research of the National Bureau of Standards,* item 8-80, 1949.

8-213. Determination of Impurities in Electroplating Solutions. XIII. Traces of Zinc in Nickel Plating Baths. W. S. Levine, P. J. Prang, M. H. Perry. *Plating,* v. 36, Aug. 1949, p. 818-823.

A colorimetric method for the above was developed using dithizone. Zn is determined colorimetrically by measuring the amount of incident light absorbed by red zinc dithizonate in a colorimeter with a green filter. 30 ref.

8-214. Electrolytic Deposition of Zinc at High Current Densities. (In Russian.) N. P. Diev. *Zhurnal Prikladnoi Khimii* (Journal of Applied Chemistry), v. 22, Apr. 1949, p. 361-366.

Influence of variations in current density, zinc concentration, organic addition agents, rate of circulation, and distance between electrodes. Character of deposits.

8-215. Distribution of Metal Deposited on Cathode Surfaces from Zincate Electrolytes. (In Russian.) N. T. Kudryavtsev and A. A. Nikiforova. *Zhurnal Prikladnoi Khimii* (Journal of Applied Chemistry), v. 22 Apr. 1949, p. 367-376.

Comparative investigation of the above with addition of tin, depending on concentration of zinc and free alkali hydroxides, and also on temperature and current density.

8-216. Electrolytic Zinc Coating in Zincate Electrolytes at High Current Densities. (In Russian.) N. T. Kudryavtsev, A. I. Lipovetskaya, and K. N. Kharlamova. *Zhurnal Prikladnoi Khimii* (Journal of Applied Chemistry), v. 22, Apr. 1949, p. 377-384.

The influence of special additions and of agitation of the electrolyte on the upper limit of safe cathode current density and on diffusion ability of the bath. It was found that only Sn, Pb, and Hg have positive influence on the cathode process, and that agitation considerably raises the upper limit of safe cathode current density, accelerating zinc plating.

8-217. Anodic Dissolution of Etched Metal. (In Russian.) G. S. Vozdvizhenskii, G. P. Dezider'ev, and D. A. Dmitriev. *Doklady Akademii Nauk SSSR* (Reports of the Academy of Sciences of the USSR), new ser., v. 65, Apr. 11, 1949, p. 697-699.

Attempts to prove, by experimental investigation, the formerly proposed theory that the process may be considered as a form of "electrodecrystallization." Results of experiments on copper and brass are charted and discussed. They indicate that the process is regulated by the degree of crystalline homogeneity of the surface.

8-218. Amperometric Determination of Certain Basic Components of Electroplating Baths. (In Russian.) N. G. Chovnyk, N. N. Kuzmina, A. N. Galkins, and B. Ya. Starik. *Zavodskaya Laboratoriya* (Factory Laboratory), v. 15, May 1949, p. 517-522.

Method for determination of Cu, Ni, Zn, and sulfate ions as applied to electroplating baths. Data comparing amperometric values with those obtained by usual means. 10 ref.

8-219. Determination of Coating Weights on Electrolytic Tinplate. H. Liebmann, J. W. Price, and S. R. Thompson. *Journal of the Society of Chemical Industry,* v. 68, June 1949, p. 177-179.

Commercial flow-brightened tinplate was found to contain a Sn-Fe alloy at the interface of the Sn and the steel base. The extent of this layer was determined and a suitable correction is suggested for coating-weight determination. Correction is approximate and its value may be influenced by the nature of the coating process.

8-220. On the Preparation of Hard Oxide Films with Precisely Controlled Thickness on Evaporated Aluminum Mirrors. George Hass. *Journal of the Optical Society of America,* v. 39, July 1949, p. 532-540.

Formation and properties of oxide films produced on evaporated Al mirrors at various temperatures in air and by anodic oxidation in ammonium tartrate. Applications of anodically produced films. 19 ref.

8-221. Attempts to Electrodeposit Tantalum. H. J. Seim and M. L. Holt. *Journal of the Electrochemical Society,* v. 96, July 1949, p. 43-47.

Methods from aqueous and nonaqueous solutions which are recorded in the literature. The authors found that they were unable to electrodeposit Ta from any of the baths described. Attempts to plate from numerous other aqueous and nonaqueous solutions were also unsuccessful.

8-222. The Electrodeposition of Molybdenum from Aqueous Solutions. Mary Joecile Ksycki and L. F. Yntema. *Journal of the Electrochemical Society,* v. 96, July 1949, p. 48-56.

Conditions under which deposition of metallic molybdenum was found to occur. 18 ref.

8-223. Silver-Surfacing Improves Performance of Gas Turbine Roller Bearings. Donald F. Wilcock and Frederick C. Jones. *Steel,* v. 125, July 25, 1949, p. 61-63, 100.

Studies of lubricating problems and metal transfer from separator to inner race, while rolls and outer race of bearings were operated at high speed, high load, and high temperature, revealed that silver-plating the brass separator prolongs bearing life and reduces metal transfer under poor lubricating conditions.

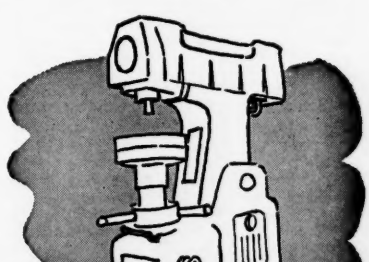
8-224. How to Plate Pressed Metal Powder Parts. E. A. Anderson. *Materials & Methods,* v. 30, Aug. 1949, p. 55-57.

Parts made by powder metallurgy can be successfully plated by making only relatively small changes in procedures normally used on wrought parts.

8-225. Periodic Reverse Current Plating on Die Castings. D. Gardner Foulke. *Die Castings,* v. 7, Aug. 1949, p. 41-42, 44-45.

On Zn-base die castings. Advantages of process.

For additional annotations indexed in other sections, see:
7B-165



PHYSICAL and MECHANICAL TESTING

9-204. Werkstoffprufung. (Testing of Materials.) E. Siebel, N. Ludwig, H. Nowotny, O. Vaupel, and H. Schallbroch. "Allegemeine Metallurgie" (Office of Military Government for Germany), 1948, p. 175-256.

Reviews German literature for 1939-46 in separate sections as follows: strength of metals in testing and in structures (Siebel); methods and apparatus for strength testing (Ludwig); cavitation wear (Nowot-

ny); nondestructive testing of materials (Vaupel); and machinability and machinability testing (Schaillbroch). 609 ref.

9-205. Tests of Ductility in Ship Structure. Wendell P. Roop. "Symposium on Deformation of Metals as Related to Forming and Service", (ASTM Special Technical Publication No. 87), 1948, p. 4-14.

Significant requirements. External and internal equivalence; notching; eccentricity, and constraint; concentration of stress and localization of strain; notched tension; notched flat plates and ships' decks; and logical reasons for use of flat tensile-test plates. 14 ref.

9-206. Notch-Sensitivity of Ship Plate —Correlation of Laboratory-Scale Tests With Large-Scale Plate Tests. Noah A. Kahn and Emil A. Imbembo. "Symposium on Deformation of Metals as Related to Forming and Service", (ASTM Special Technical Publication No. 87), 1948, p. 15-44; discussion, p. 45-52.

Mechanism of fracture and notch-sensitivity characteristics of mild or medium steels and test methods for evaluation of susceptibility of ship plate to brittle or cleavage fracture. Deals particularly with the Navy tear-test method for quality control of ship plate. Data on the influence of nitrogen content and effects of variations in the geometry of the test specimen. 12 ref.

9-207. Measurement of Ductility in Sheet Metals. John R. Low, Jr., and Thomas A. Prater. "Symposium on Deformation of Metals as Related to Forming and Service", (ASTM Special Technical Publication No. 87), 1948, p. 53-63; discussion, p. 64-65.

Methods for measurement of uniform elongation and reduction of area in modified tension-type tests of sheet metals. Relationship between the two and forming limits in various types of forming operations, particularly stretching and bending. 12 ref.

9-208. Hydraulic Bulge Testing of Sheet Metals. W. T. Lankford. "Symposium on Deformation of Metals as Related to Forming and Service", (ASTM Special Technical Publication No. 87), 1948, p. 66-80; discussion, p. 81-82.

Permits stretching of sheet specimens in more than one direction. The circular bulge test was studied, and an elliptical bulge test was developed which stretches the specimen more in one direction than in the other. Tests were applied to strain hardening characteristics and ductility of several Al-alloy sheet materials under combined biaxial tensile stresses.

9-209. Notched Bar Tension Tests on Annealed Carbon Steel Specimens of Various Sizes and Contours. M. L. Fried and G. Sachs. "Symposium on Deformation of Metals as Related to Forming and Service", (ASTM Special Technical Publication No. 87), 1948, p. 83-115; discussion, p. 116-117.

Effects of section size and notch contour on strength and fracture properties of fully annealed SAE 1025 silicon-killed steel. An analysis was made of the fractured surfaces of specimens tested and relative amounts of flat, shear, fibrous, and cleavage areas were obtained. Longitudinal and circumferential strains on the surface were measured after given amounts of strain and after fracture, and distribution of hardness over longitudinal sections was obtained. Method for calculating distribution of longitudinal, radial, and circumferential strains over the notched section. 20 ref.

9-210. Beoordeling van de koudbrosheid van dun plaatijzer met de heenen weerbuigproef. (Determination of Cold-Brittleness of Thin Sheet Iron by Means of Repeated Bending.) J. H. Palm. *Metalen,* v. 3, Mar. 1949, p. 145-148.

Results of experimental work which indicate that the repeated-bending test is preferable to impact testing.

9-211. Rapid Method for Determination of the Hardness of Welds. (In Russian.) O. G. Vegner. *Avtogennoe Delo* (Welding), Mar. 1949, p. 21.

Method using a modified Poldi apparatus.

9-212. Praktische Verschleissprufung. (Practical Wear Testing.) H. Wahl. *Archiv fur Metallkunde,* v. 2, Apr. 1949, p. 121-128.

Industrial and laboratory methods, instruments, and problems of testing the wear resistance of metals. 28 ref.

9-213. Halbautomatische Festigkeitsprufung von Leichtmetallblechen. (Semi-Automatic Strength Testing of Light-Metal Sheets.) Kurt Matthaes. *Zeitschrift fur Metallkunde,* v. 40, May 1949, p. 198-200.

An attachment to the tensile-testing machine which records automatically the 0.2 yield point, tensile strength, and elongation.

9-214. Choice of the Shape of Notch in the Notch-Toughness Test. J. Pomey, A. Cadilhac, and R. Coudray. *Metallurgia,* v. 40, June 1949, p. 122. Translated and condensed from *Revue de Métallurgie,* v. 45, Nov. 1948, p. 455-467; Dec. 1948, p. 525-540.

Previously abstracted from original, items 9-93 and 9-111, 1949.

9-215. Two Million Pound-Inch Torsion Testing Machine Completed at Lehigh University. *Steel Processing,* v. 35, June 1949, p. 309.

9-216. Bulge Testing of Sheet Metal. Helmut Thielsch. *Metal Progress,* v. 56, July 1949, p. 86-88.

Attempts to bridge the gap between theoretical work and practical test procedures. Believes that bulge testing may have better correlation with formability of sheet metals than other cupping tests. Data for 2S-O aluminum.

9-217. Creep-Testing Facilities Expanded by National Tube Research Laboratory. *Industrial Heating,* v. 16, July 1949, p. 1176, 1178, 1180.

9-218. Testing Magnetic Materials. B. M. Smith. *American Society for Testing Materials,* "Symposium on Magnetic Testing", 1949, p. 3-15.

Some accepted methods and instruments commonly used by the electrical manufacturing industry in the development, design, and control of magnetic materials. 12 ref.

9-219. Permanent Magnet Test Methods and Their Validity in Determining Product Performance. C. A. Maynard and J. E. Mitch. *American Society for Testing Materials,* "Symposium on Magnetic Testing", 1949, p. 17-28; discussion p. 29.

Various factors involved in selection of suitable tests for the relationship between product performance and magnetic tests.

9-220. Core Loss Test for Narrow Silicon Steel Strip. J. A. Ashworth. *American Society for Testing Materials,* "Symposium on Magnetic Testing", 1949, p. 30-37; discussion p. 38.

Test method by which the across-grain core loss may be measured in Si-steel strip when the standard ASTM method cannot be applied. Utilizes a modified Epstein method.

9-221. D-C. Permeability Testing of Epstein Samples with Double-Lap Joints. D. C. Dieterly. *American Society for Testing Materials,* "Symposium on Magnetic Testing", 1949, p. 39-57; discussion p. 58-62.

Experimental tests which demonstrate that the d.c. permeability test on Epstein samples can be made very accurately, even at inductions normally considered too low for accurate testing in any commercial permeameter.

9-222. A New D-C. Permeameter. W. J. Carr, Jr. *American Society for Testing Materials,* "Symposium on Magnetic Testing", 1949, p. 63-79; discussion p. 80-81.

A new type of d. c. permeameter for testing soft magnetic material, in which tests can be made on single strips and rods much shorter than required heretofore.

9-223. The Testing of Magnetic Recording Media. D. E. Wiegand. *American Society for Testing Materials,* "Symposium on Magnetic Testing", 1949, p. 141-152; discussion p. 153.

Listening tests, measurement of final performance characteristics, and measurement of basic magnetic properties. Built-in calibration and positive means of compensation allow accuracy comparable to that of the ballistic galvanometer method, with great savings in time.

9-224. Resistance of Metals to Deformation at Rates of 10^{-6} to 10^{2} M. per Sec. I. (In Russian.) F. F. Vitman, N. A. Zlatin, and B. S. Ioffe. **II.** F. F. Vitman, and N. A. Zlatin. *Zhurnal Tekhnicheskoi Fiziki* (Journal of Technical Physics), v. 19, Mar. 1949, p. 300-326.

Simple method and apparatus for investigating the relationship of deformation resistance to deformation rate. Data for Pb, Al, Cu, mild steel, and duralumin. Results indicate the existence of three different regions within the above range of rates of deformation, in which the character of the deformation process is fundamentally different from the other two. 27 ref.

9-225. Formation of Residual Stresses of the First Order During Tensile Stress. II. Problem of the Presence of a Weakened Surface Layer. (In Russian.) L. A. Glikman, T. P. Sanfirova, and V. A. Stepanov. *Zhurnal Tekhnicheskoi Fiziki* (Journal of Technical Physics), v. 19, Mar. 1949, p. 327-335.

Studied using an accurate method of testing on various shapes of test specimens. The appearance of residual stress during testing of specimens of carbon steel above their yield point. By analysis of the results, the existence of thin weakened surface layers was established.

9-226. Problem of Hertz and the Brinell Test. (In Russian.) G. P. Zaitsev. *Zhurnal Tekhnicheskoi Fiziki* (Journal of Technical Physics), v. 19, Mar. 1949, p. 336-346.

A formula correlating the formulas of Hertz and Meyers. Because of the closed relationship of the parameters of elasticity and plasticity, the formula of Hertz and the modified formula give the same results when the maximum diameter of the imprint represents maximum elastic and minimum plastic imprint.

9-227. Plotting of Diagrams of True Stresses on the Basis of Hardness and Technological Tests. (In Russian.) M. P. Markovets. *Zhurnal Tekhnicheskoi Fiziki* (Journal of Technical Physics), v. 19, Mar. 1949, p. 371-382.

Problem was investigated theoretically and experimentally for ferrous and nonferrous metals. Analysis of the diagrams resulted in establishment of a relationship between diameter of ball impression and degree of deformation during tensile test. A new method of plotting true-stress diagrams from yield point to fracture, on the basis of hardness determinations and tensile-test data.

9-228. Micromechanical Method for Investigation of Materials. (In Russian.) I. M. Roitman and Ya. B. Fridman. *Zhurnal Tekhnicheskoi Fiziki* (Journal of Technical Physics), v. 19, Mar. 1949, p. 421-430.

Newly developed method and apparatus for micromechanical testing of materials (tensile, bending, torsion, and shear tests).

9-229. Investigation of Deformation Condition with Assistance of Rolled-On Indexing Grids. (In Russian.) T. K. Zilova and Ya. B. Fridman. *Zhurnal Tekhnicheskoi Fiziki* (Journal of Technical Physics), v. 19, Mar. 1949, p. 431-440.

New simplified method for investigating local plastic deformations by transfer of mesh designs onto polished test specimens. Experiments on Cr steel and pure Al, differently heat treated, indicate applicability of this method. Results.

9-230. Una macchina per prove di fatica a flessione rotante; lavorazione e misura delle provette. (Rotating-Beam Fatigue-Test Machine; Preparation and Measurement of Test Specimens.) G. Bedeschi. *Alluminio,* v. 18, Mar.-Apr. 1949, p. 139-146.

An improved rotating cantilever-beam machine operating at high velocities, particularly adaptable for testing light alloys. A special method for preparing test specimens is indicated. Formulas for calculation of applied stress.

9-231. Determination of Hardness on the Rockwell Apparatus Using a Pyramidal Point. (In Russian.) V. K. Grigorovich. *Zavodskaya Laboratoriya* (Factory Laboratory), v. 15, May 1949, p. 572-575.

Proposes use of pyramided instead of conical points or steel balls. This permits establishing a direct relationship between Rockwell and Vickers hardness values without complicated calculations.

9-232. Method of Investigation of the Characteristics of Steel Fractures. (In Russian.) B. S. Natapov. *Zavodskaya Laboratoriya,* (Factory Laboratory), v. 15, May 1949, p. 576-580.

Various methods. Importance of determination of the crystal structure of the fracture zone and relationship to mechanical properties.

9-233. Method for Determination of Stresses in Cast Structural Elements. (In Russian.) Ya. A. Smolyanitskii. *Zavodskaya Laboratoriya,* (Factory Laboratory), v. 15, May 1949, p. 584-588.

Method using a dial-type instrument called the "optimeter". High sensitivity of this method in residual-stress determinations was confirmed experimentally.

9-234. Testing Ring-Shaped Specimens. (In Russian.) T. V. Aref'ev. *Zavodskaya Laboratoriya,* (Factory Laboratory), v. 15, May 1949, p. 589-594.

Proposed use for tensile testing. This method is suitable for determination of yield point, yield strength, and relative residual elongation and contraction. Test procedure and structural details of apparatus. Comparative data for ring-shaped and standard specimens.

9-235. Testing of Micro Tensile-Test Specimens. (In Russian.) E. M. Savitskii and V. P. Lebedev. *Zavodskaya Laboratoriya* (Factory Laboratory), v. 15, May 1949, p. 614-616.

Proposes use of very small test specimens (1 mm. in diameter), thus avoiding waste of critical material. The apparatus can be used for testing materials under tensile or compressive stresses. Structural details.

9-236. Furnace for Short and Long-Time Creep Tests at High Temperature. (In Russian.) A. V. Antonovich. *Zavodskaya Laboratoriya* (Factory Laboratory), v. 15, May 1949, p. 618-621.

Method of operation. Electrical circuits for temperature regulation and for furnace heating.

9-237. A New Instrument for the Theoretical Determination of Stress Distributions in Flat Plates of Irregular Shape. Ch. Massonnet. *Engineers' Digest,* v. 10, July 1949, p. 233-237. Translated and condensed from *Revue Universelle des Mines,* ser. 9, v. 5, Feb., 1949, p. 41-51.

Instrument for a graphical and mechanical method. Theory and mechanical conversion, and examples.

9-238. Interferometric Examination of Hardness Test Indentations. S. Tolansky and D. G. Nickols. *Nature,* v. 164, July 16, 1949, p. 103-104.

By means of multiple-beam interference methods the authors are carrying out a systematic examination of the distortions produced on various surfaces by standard diamond hardness indenters. Preliminary observations made with a Vickers diamond pyramid and with a Rockwell cone on sintered tungsten carbide, on stainless steel, and a silver steel.

9-239. Measurement and Relaxation of Residual Stresses. W. Soete. *Welding Journal,* v. 28, Aug. 1949, p. 354s-364s.

See abstract from *Sheet Metal Industries,* item 9-179, 1949.

9-240. Proposed Revision of Tentative Recommended Practice for Tension Test Specimens for Copper-Base Alloys for Sand Castings; ASTM Designation: B 208-49T. *Foundry,* v. 77, Aug. 1949, p. 135-136.

9-241. PV Test Applied to Gearing Steel. J. G. Christ. *Iron Age,* v. 164, Aug. 11, 1949, p. 88-90.

A simple, inexpensive production-line method for determining the hardenability of shallow hardening steels. Application to medium-carbon gear steels.

9-242. Mesures des contraintes résiduelles a la surface des aciers cémentés et trempés. (Determination of Residual Stresses on the Surface of Sintered and Annealed Steels.) Jacques Pomey, Louis Abel, and Francois Goutel. *Comptes Rendus* (France), v. 228, Aug. 16, 1949, p. 1565-1567.

Method. Schematic drawings indicate structural details of the apparatus used. Data of a typical determination.

9-243. (Book) **Symposium on Magnetic Testing, 1948.** 198 pages. 1949. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. (Special Technical Publication No. 85.)

Introduction by P. H. Dike plus 10 papers and accompanying discussion presented at 51st annual ASTM meeting, June 22, 1948. Individual papers are abstracted separately.

9-244. (Book) **Symposium on Deformation of Metals as Related to Forming and Service.** 117 pages. 1948. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. (Special Technical Publication No. 87.)

Contains five papers which are separately abstracted.

For additional annotations indexed in other sections, see:
18B-132

AVOID DELAY AT THE REGISTRATION DESK

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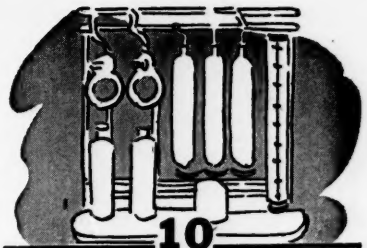

10 ANALYSIS

10A—General

10A-111. Automatic Recording of Polarographic Data. L. B. Rogers and others. *Analytical Chemistry,* v. 21, July 1949, p. 777-781.

Polarographic analyses appear to be feasible using a platinum micro-electrode and the usual automatic recording technique. The effects on half-wave potential and diffusion current of using different rates of polarization, larger electrode areas, and stirring. 15 ref.

10B—Ferrous

10B-66. Beitrag zur Prufung der Stähle nach dem Funkenbild. (The Spark-Testing of Steels.) G. Halfter. *Archiv fur Metallkunde,* v. 2, Apr. 1949, p. 149-150.

A suitable selection of colored filters can improve the accuracy of spark testing.

10B-67. Vergleichende Untersuchungen uber die Bestimmung des Sauerstoffs im Stahl. (Comparative Study of the Determination of Oxygen in Steel.) Paul Klinger. *Archiv fur das Eisenhuttenwesen,* v. 20, May-June 1949, p. 151-163.

Vacuum-melt, chlorine, and electrolytic methods. Results obtained in different laboratories are compared. 22 ref.

10B-68. Alloy Steel Analysis; Determination of Tungsten, Molybdenum, Vanadium. *Metallurgia,* v. 40, June 1949, 119, 121.

Based on article by R. Niericker and W. D. Treadwell, in *Helvetica Chimica Acta,* p. 1472-1483, item 10-136, 1946.

10C—Nonferrous

10C-113. Ein Prufgerat zur Werkstoffunterscheidung mit Hilfe des elektrolytischen Potentials. (An Apparatus for Classifying Materials on the Basis of Their Electrolytic Potentials.) Kurt Matthaes. *Zeitschrift fur Metallkunde,* v. 40, May 1949, p. 194-195.

A simple instrument for rapidly sorting different Al-Mg, and Cu alloys and how it can be combined with the magneto-inductive testing process.

10C-114. The Electrolytic Estimation of Cadmium from Sulphuric or Perchloric Acid Solutions. G. H. Osborn. *Metallurgia,* v. 40, June 1949, p. 111-113.

Methods for the electrodeposition of Cd for analytical purposes are reviewed and critically discussed. None of these methods result in an ideal deposit and a modification is suggested by which it is possible to obtain quantitative results and a firm bright deposit. The method gives complete separation from Ni, Zn, and Cu. Bi, if present, would co-deposit, but this is said to be a rare contaminant. 15 ref.

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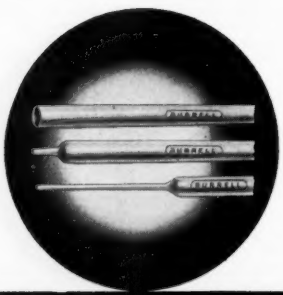

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10C-115. Metallindikatoren. I. Murexid als Indikator auf Calcium- und andere Metall-Ionen. Komplexbildung und Lichtabsorption. (Metal Indicators. I. Murexid as an Indicator of Calcium and Other Metal Ions. Complex Formation and Light Absorption.) G. Schwarzenbach and H. Gysling. *Helvetica Chimica Acta*, v. 32, June 15, 1949, p. 1314-1325.

Use of above organic reagent for analytical purposes. Color reaction with Sr, Ba, Mg, Zn, and Cd ions. Light-absorption curves.

10C-116. Iodometric Determination of Zinc. Eugene K. Maun and Ernest H. Swift. *Analytical Chemistry*, v. 21, July 1949, p. 798-801.

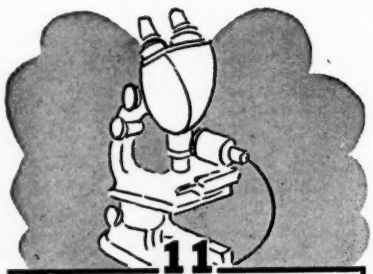
Under the conditions of the procedure recommended, the necessity for stepwise addition of ferricyanide and successive titrations of iodine is eliminated and a stable end point obtained. A precision of 1-2 parts per thousand can be expected. 16 ref.

10D—Light Metals

10D-28. Massanalytische Kupfer - Schnellbestimmung im Duralumin. (Rapid Quantitative Determination of Copper in Duralumin.) F. Weste. *Archiv fur Metallkunde*, v. 2, Apr. 1949, p. 147-149.

The proposed method is based on reduction of the Cu in the Cu-tartaric acid complex followed by titration of the resulting $FeSO_4$.

For additional annotations indexed in other sections, see:
8-218



APPARATUS, INSTRUMENTS and METHODS

11-242. Mikroskopische und Röntgenographische Untersuchung. (Microscopic and X-Ray Investigations.) A. Schrader, H. Mahl, W. Hofmann, and H. Neerfeld. "Allegemeine Metallurgie" (Office of Military Government for Germany), 1948, p. 147-173.

Reviews German literature for 1939-46. Consists of separate sections as follows: preparation of polishing and etching compounds for microstructural studies (Schrader); the electron microscope (Mahl); X-ray investigation of structure (Hofmann); and X-ray measurement of elastic stresses (Neerfeld). 128 ref.

11-243. Application of Pneumatic Method for Evaluation of the Quality of Surface Finishes. (In Russian.) M. L. Brzhezinskii. *Stanki i Instrument* (Machine Tools and Instruments), v. 20, Mar. 1949, p. 20-22.

"Pneumatic profilograph" with automatic recording. It consists, essentially, of a hydraulic pressure regulator, a pneumatic chamber, a recording manometer, and a measuring attachment.

11-244. Röntgenbestimmung der Tiefenverteilung von Härte- und Nitrierspannungen. (Determining the Depth Distribution of Hardness and Nitration Stresses by an X-Ray Method.) Richard Glocker and Helmut Hasonmaier. *Metallkunde*, v. 40, May 1949, p. 182-186.

Preliminary experiments made to improve the sharpness of the X-ray lines with the crystal monochronator. The depth distribution of the internal stresses of hardened and nitrated steel was determined by step-wise etching and X-ray recording. A method of reducing the stresses of nitrated steel.

11-245. Sur la structure micrographique du laiton α-soumis a l'abrasion. (Micrographic Structure of α-Brass Subject to Abrasion.) Pierre A. Jacquet. *Comptes Rendus*, v. 228, May 2, 1949, p. 1439-1440.

A newly developed etching agent (formerly described in v. 228, 1949, p. 1027 item 11-216, 1949) permitted study of structural changes caused by the use of abrasives on annealed alpha-brass. Such a method seems to be applicable to the study of solid solutions of Cu-Zn, subject to other types of mechanical deformation.

11-246. Indicator for Small Amounts of Oxygen in Reducing Furnace Atmospheres. G. W. Rathenau and H. de Wit. *Metallurgia*, v. 40, June 1949, p. 114.

Simple devices in which gas flows through a glass bulb containing an electrically heated strip of stainless steel. If the oxygen pressure of the gas has exceeded the oxygen pressure of the chromium oxides at the heating temperature chosen, surface oxidation is readily observable. By varying the temperature of the strip the absolute value of the oxygen pressure can be roughly determined.

11-247. The Determination of Static and Dynamic Yield Stresses Using a Steel Ball. R. M. Davies. *Proceedings of The Royal Society*, ser. A, v. 197, June 22, 1949, p. 416-432.

The above stresses of a thick steel plate may be estimated by pressing and by dropping a hard steel ball on a plane surface of the plate which has been ground and then polished. The static method consists of finding the least force which must be applied to the ball to produce a permanent indentation; and the dynamic method of finding the least normal velocity of impact which gives a similar indentation. 13 ref.

11-248. Determination of Space Groups by Intensity Statistics. D. Rogers. *Research*, v. 2, July 1949, p. 342-343.

Statistical method for study of the intensities of X-ray reflections recently proposed by Wilson. In favorable instances this opens up a new method of distinguishing between space groups.

11-249. High Temperature Furnace for Electron Diffraction Studies of Thin Films. Eileen I. Alessandrini. *Journal of Applied Physics*, v. 20, July 1949, p. 691-693.

Patterns are obtainable up to 1100° C.

11-250. Metallographic Technique for Steel; Photomicrography. *Metal Progress*, v. 56, July 1949, p. 80-B.

Photomicrographs illustrate effects of wave length and resolution; opening of field diaphragm and contrast; prism and plane glass illuminators; axial and conical illumination; and bright and dark-field illumination.

11-251. A Device to Deposit Automatically the Proper Thickness of Metals used in Shadow-Casting in Electron Microscopy. Francis W. Bishop. *Review of Scientific Instruments*, v. 20, July 1949, p. 527-529.

11-252. A Technique for the Production of Silica-Filmed Electron Micro-

scope Screens in Quantity. Francis W. Bishop. *Review of Scientific Instruments,* v. 20, July 1949, p. 529-530.

11-253. A Simple Punch for Precision Cutting of Photographic Film in a Cylindrical X-Ray Diffraction Camera. E. J. Grill and A. H. Weber. *Review of Scientific Instruments,* v. 20, July 1949, p. 532.

11-254. A Magnetic Beam-Splitting Focusing Device for the Electron Microscope. Francis W. Bishop. *Review of Scientific Instruments,* v. 20, July 1949, p. 532-533.

11-255. Etude experimentale de la cinetique des transformations dans les corps solides. (Experimental Study of the Kinetics of Transformation in Solids.) M. G. Borelius. *Bulletin de la Société Chimique de France,* Mar.-Apr. 1949, p. D189-D192.

Different methods used at the Institute of Physics of the Polytechnic High School in Stockholm. Apparatus is suitable particularly for study of metals but may be applied to non-metals after slight modification.

11-256. The Evaluation of Hysteresis Core Loss by Power Equations. Horatio W. Lamson. *American Society for Testing Materials,* "Symposium on Magnetic Testing", 1949, p. 96-111; discussion p. 112.

A study was made of exponents and coefficients occurring in the Steinmetz and Rayleigh equations for hysteresis core loss. Significance of exponents in the domain theory.

11-257. Magnetic Stress Analysis. P. E. Cavanagh and T. Wlodek. *American Society for Testing Materials,* "Symposium on Magnetic Testing", 1949, p. 123-139; discussion p. 140.

Dyna-magnetic analyzer which provides a simple means for measuring internal microstresses or stress changes in parts as well as calibrating other magnetic test instruments. 29 ref.

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12 INSPECTION and STANDARDIZATION

12-145. Ultrasonic Inspection. *Metal Progress,* v. 56, July 1949, p. 114. Translated and condensed from "Application of Ultrasonics in Engineering and Physics", S. Ya. Sokolov, *Zavodskaya Laboratoriya* (Factory Laboratory), v. 14, Nov. 1948, p. 1328-1335.

Previously abstracted from original, item 11-34, 1949.

12-146. Quality Control Review: Summarize Test Procedures for Malleable Foundrymen. M. O. Booth. *American Foundryman,* v. 16, July 1949, p. 56-58.

One of a series of papers presented at Lecture Course Sessions of 52nd annual AFS meeting.

12-147. Ultramodern Supersonics and X-Rays. J. J. Pierce. *Metal Progress,* v. 56, July 1949, p. 62-65.

Proceedings of recent symposium on techniques, held at the dedication of the million-dollar X-ray laboratory at Naval Ordnance Laboratory, White Oak, Md.

12-148. Specifications for Structural Steel in Low-Temperature Service. Albert W. Zeuthen. *Metal Progress,* v. 56, July 1949, p. 78-79.

Efforts toward coordination of current specifications rather than evolution of new specimens and tests.

12-149. The Probolog, for Inspecting Nonmagnetic Tubing. George A. Nelson. *Metal Progress,* v. 56, July 1949, p. 81-85.

Instrument for inspecting tubing of heat exchangers, condensers, coolers, without dismantling. A probe connected to a recording instrument and containing a pair of coils which generate a magnetic field is pulled at a constant rate through the tubing. The magnetic field penetrates the walls of the tube, inducing eddy currents which exert a riciprocal influence on the impedance of the coils. Pen deflections are related to the character and amount of defects, both external and internal.

12-150. New SAE Finish Standard Aims to Help Engineer and Shop Man. *SAE Journal,* v. 57, July 1949, p. 33-38.

The above and its use. The standard is published in the 1949 SAE Handbook.

12-151. Development and Effects of the Revised Screw Thread Standard. E. J. Bryant. *Tool Engineer,* v. 23, July 1949, p. 17-20.

One of the last formal steps in the presentation to industry of an international unified screw thread standard, the B1-1-1949 Report on the Standardization of Screw Threads, published under ASME sponsorship, has now been made available. Essentials of this report along with the story of the conferences leading to its adoption. Detailed comparison of the various present and unified threads.

12-152. Turbine-Blade Inspection. *Aircraft Production,* v. 11, July 1949, p. 234-236.

New Swiss equipment based wholly on optical principles.

12-153. Specifications for Magnesium Alloys. *Machinery,* v. 55, July 1949, p. 261.

12-154. Specifications for Aluminum Alloys. *Machinery,* v. 55, July 1949, p. 261.

12-155. Collecting Standardization Data. J. R. Townsend. *Standards World,* v. 1, Summer 1949, p. 31-50.

General procedures and details of three specific examples: determination of requirements for testing of nonferrous sheet metal; determination of the contact resistance of brass; and investigation of the accuracy of micrometers.

12-156. Checking a Splined Cone with the Auto-Collimator. W. F. Wiggs. *Machinery* (London), v. 75, July 14, 1949, p. 56.

Method is described and diagrammed.

12-157. Magnetic Analysis Inspection in the Steel Industry. Theodore Zuschlag. *American Society for Testing Materials,* "Symposium on Magnetic Testing", 1949, p. 113-120; discussion p. 121-122.

Problems of steel inspection and requirements for the above. Inspection methods, equipment, and industrial installations. Circuit diagrams.

12-158. Luminescent Method of Defect Detection in the Metal Working Industries. (In Russian.) M. M. Laushkina and F. I. Rogov. *Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya* (Bulletin of the Academy of Sciences of the USSR, Physical Series), v. 13, Mar.-Apr. 1949, p. 251-252; discussion p. 252-253.

Method for detecting cracks and other flaws in manufactured objects. Is recommended strongly because of its extreme simplicity, accuracy, and low cost.

12-159. Black Light Inspection of Castings. Franklin Catlin. *Foundry,* v. 77, Aug. 1949, p. 168-170, 172, 174.

Method and applications.

12-160. Radiographic Examination of Large Carbide-Faced Parts. J. M. Williams. *Product Engineering,* v. 20, Aug. 1949, p. 130.

12-161. Checking Three-Fluted Taps. *Machinery,* v. 55, Aug. 1949, p. 161.

Technique used by Warner & Swasey Co.

12-162. Immersed Ultrasonic Inspection. Rebecca H. Smith and Donald C. Erdman. *Iron Age,* v. 164, Aug. 4, 1949, p. 83-88.

Method in which the scanning crystal is submerged in a liquid to minimize multiple reflections. Advantages claimed are a reduction in surface smoothness requirements; ability to focus the beam into fillets, complex surfaces and other areas not flat enough for contact crystals; and ability to use higher frequency crystals. Applications in stressed aircraft parts.

12-163. Testing Flash Butt Welds. *Iron Age,* v. 164, Aug. 4, 1949, p. 106.

Most important in getting good welds is the proper setting of the welding machine.

12-164. Test Jigs Insure Accurate Parts. Clarence Dunlop. *American Machinist,* v. 93, Aug. 11, 1949, p. 98-100.

Inexpensive gaging fixtures with guided plug gages and indicating pointers simplify inspection of small parts to close limits.

12-165. New Screw Thread Standards. E. G. Wertheimer. *Science,* v. 110, Aug. 12, 1949, p. 155-159.

Details agreed to by Great Britain, Canada, and the U. S.

12-166. (Book) Principles of Magnaflux. Ed. 3. F. B. Doane and C. E. Betz. 338 pages. Photopress, Inc. (available from Magnaflux Corp., 59 Northwestern Highway, Chicago 31, Ill.) $5.00.

Basic electrical principles through the range of methods, materials and equipment now in use. Applications in such fields as the railroads, high-production industries, welding, aircraft.

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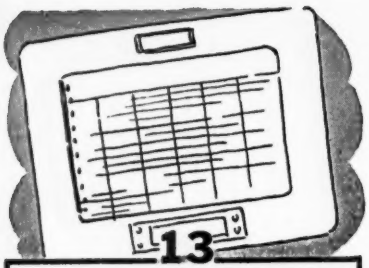
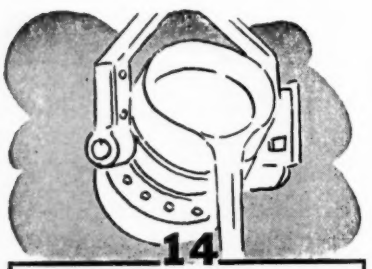


13 TEMPERATURE MEASUREMENT and CONTROL

13-52. Iets over de temperatuurregeling van ovens ten behoeve van thermische analyses. (The Temperature Control of Furnaces Used for Thermal Analysis.) E. M. J. Mulders. *Metalen*, v. 3, Apr. 1949, p. 165-168; *Central Instituut voor Materiaal Onderzoek Afdeling Metalen*, Apr. 1949, p. 1-4.

Temperature-control device for ovens and furnaces by which a linear temperature-time function can be realized.



14 FOUNDRY PRACTICE

14A—General

14A-96. Middelen ter bestrijding van krimpholten in gietstukken. (Means of Avoiding Shrinkage Cavities in Castings.) M. Stap. *Metalen*, v. 3, Mar. 1949, p. 149-153; *Centraal Instituut voor Materiaal Onderzoek Afdeling Metalen*, Mar. 1949, p. 1-4.

Practical recommendations.

14A-97. Onderzoek en controle van vormzand. (Testing and Control of Molding Sand.) M. Stap. *Metalen*, v. 3, Apr. 1949, p. 175-181; also *Centraal Instituut voor Materiaal Onderzoek Afdeling Metalen*, Apr. 1949, p. 5-10.

Methods for controlling the moisture content, granulation, gas permeability, and strength of sand molds.

14A-98. Eine neue Steuervorrichtung an Ruttel-Press-Formmaschinen. (A New Control Device for the Jolt-Squeeze Machine.) Wilh. Alb. Bessердich. *Die Neue Giesserei*, v. 36, (new ser., v. 2), June 1949, p. 184-185.

A device that protects both operator and pattern from injury.

14A-99. Precision Investment Casting. Albert W. Merrick. *Metal Progress*, v. 56, July 1949, p. 53-57.

Limitations; mechanical properties and their consistency among bars from the same cast and casts from a series of heats; melting and casting methods; and economics.

14A-100. Stop Metal Losses and Watch Costs Go Down. A. D. Barczak. *American Foundryman*, v. 16, July 1949, p. 50-55.

Various avenues for loss of metal in the foundry and recommendations for their reduction.

14A-101. Heat Transfer—A Foundryman's Tool. Victor Paschkis. *American Foundryman*, v. 16, July 1949, p. 59-63.

In the first part, the elements of heat flow are presented in simple and readily understandable terms. In the second part, foundry practice is examined from the thermal viewpoint. In the third part, the electric analogy method is briefly explained. 12 ref.

14A-102. Production and Consumption of Heat in the Cupola. *Industrial Heating*, v. 16, July 1949, p. 1182, 1184. Condensed from paper by D. W. Gunther.

A number of theoretical calculations relating fuel quality to cupola performance.

14A-103. Role of Gas in Development of Precision Casting Industry. Cornelius Ackerson. *Industrial Gas*, v. 28, July 1949, p. 5-6, 26-28.

Equipment and procedures.

14A-104. Intricate Parts for Jet Engines Cast by the Lost Wax Method. George H. DeGroat. *Machinery*, v. 55, July 1949, p. 188-193.

Using stellite, inconel, monel, nickel, and similar alloys.

14A-105. Jet-Engine Components Cast Centrifugally in Permanent Molds. Thomas S. Quinn, Jr. *Machinery*, v. 55, July 1949, p. 194-199.

Using "Centri-Die" process.

14A-106. Ethyl Silicate; Applications to Specialized Foundry Problems. D. F. B. Tedds. *Metal Industry*, v. 75, July 8, 1949, p. 27-30, 33.

Production from metallic silicon and uses in precision casting, as a mold or core dressing, for bonding furnace linings, and in the production of cores. Details of compounding and procedures.

14A-107. Casting Design as Influenced by Foundry Practice. Oliver Smalley. *Foundry Trade Journal*, v. 87, July 21, 1949, p. 91-94; discussion p. 94-95.

Some rules for designers of castings.

14A-108. Precision Toolmaking Via "Lost-Wax" Casting. A. E. Rylander. *Tool Engineer*, v. 23, Aug. 1949, p. 42-43.

Steps involved. Advantages which include casting to close limits of tolerance and infinite duplication of parts.

14A-109. New Pattern Material Has Unusual Characteristics. *Foundry*, v. 77, Aug. 1949, p. 152, 154.

Properties and applications of densified wood.

14A-110. Compressed Air; Use in a Production Foundry. *Foundry*, v. 77, Aug. 1949, p. 164, 166.

14B—Ferrous

14B-75. Untersuchungen uber die Primärkristallisation von unlegierten und legierten Stählen. (Research on the Primary Crystallization of Unalloyed and Alloyed Steels.) Hanns Wentrup and Hans Schrader. *Archiv fur das Eisenhuttenwesen*, v. 20, May-June 1949, p. 165-178.

Effect of inclusions on primary crystallization taking into consideration the effects of aluminum deoxidation, the formation of nitride, primary sulfide precipitation, melting and pouring temperatures, condition and temperature of the molds, evolution of gases, and salt additions. 15 ref.

14B-76. Hot Tears in Cast Steel Tubes. *Industrial Heating*, v. 16, July 1949, p. 1186. Condensed from "Prevention of Hot Tears in Thick-Walled Centrifugally Cast Steel Tubes", J. F. Wallace and J. L. Martin, *American Foundrymen's Society*, Preprint No. 3, 1949.

Previously abstracted from original, item 14B-45, 1949.

14B-77. Blast Humidity as a Factor in Cupola Operation. *Industrial Heating*, v. 16, July 1949, p. 1196, 1198. Condensed from paper by D. E. Krause and H. W. Lownie, Jr.

Results of experimental study of the effects of moisture content of the blast upon operation of the cupola and properties of the iron produced.

14B-78. Design and Operation of a 10 in. Diameter Cupola. *Industrial Heating*, v. 16, July 1949, p. 1200, 1202. Condensed from paper by D. E. Krause and H. W. Lownie, Jr., *American Foundrymen's Society*, Preprint 12, 1949.

Previously abstracted from original, item 14A-51, 1949.

14B-79. Symposium: Nodular Graphite Cast Iron. *American Foundryman*, v. 16, July 1949, p. 32-41.

Separate communications (without titles) by D. J. Reese, C. K. Donoho, Gosta Vennerholm, and R. G. McElwee. Reese describes properties, production, and fabrication of ductile cast iron; comparative stress-strain curves of plain gray iron and ductile cast iron; influence of section thickness on mechanical properties of a cupola iron; influence of P, C, and Si on mechanical properties; also several photomicrographs. Donoho elaborates and modifies some points discussed in his paper "Producing Nodular Graphite With Magnesium" (Feb. issue). Vennerholm reviews progress of the past few years and results obtained by Ford Motor Co. Structures of several irons treated with a 50-50 Mg-Cu alloy. McElwee remarks concerning the present status of nodular iron.

14B-80. Modern Foundry Methods. *American Foundryman*, v. 16, July 1949, p. 42-43. From "Steel Castings in Welded Assemblies," John Howe Hall, to be published in *Transactions of the American Foundrymen's Society*, v. 57, 1949.

Various phases of the thermit-welding process of producing large steel castings for ships' structures.

14B-81. Present-Day Trends in Runner Practice. J. F. Measures. *Foundry Trade Journal*, v. 87, July 14, 1949, p. 57.

Runners used on medium-weight, machine-molded gray-iron castings. Their purpose is to fill the mold at predetermined speed and in such a manner that impurities cannot enter. Recent multi-ingate or distributed types of runner and a spring-loaded downright or runner basin for machine molding.

14B-82. Insulation of Risers for Ferrous Castings. James R. Power. *Foundry*, v. 77, Aug. 1949, p. 68-71, 230-231.

Experiments conducted with an inexpensive method of insulating risers to obtain a higher yield. A mixture of 40% sawdust, 26% dextrin and 34% water is pressed into the desired shapes, dried, coated with a refractory wash, and molded in position upon a pattern to form a riser cavity. When insulated risers are employed, the risers can be reduced in volume by at least 50%. Some disadvantages of the method.

14B-83. A Metallurgist Looks at Steel Foundry Operations. Everett R. Turner. *Foundry*, v. 77, Aug. 1949, p. 79, 222-229.

Importance of the cost factor and miscellaneous suggestions for furnace design, refractories, and operating procedures.

14B-84. Machine Molding of Steel Castings. John Howe Hall. *Foundry*, v. 77, Aug. 1949, p. 82-85, 175-176, 178, 180-181.

Second of four articles.

14B-85. Progressive Foundry Mechanization. Walter Rudolph. *Foundry*, v. 77, Aug. 1949, p. 196, 198.

At a comparatively small foundry for the production of heavy gray-iron castings.

14C—Nonferrous

14C-59. The Use of Collapsible Cores. H. K. Barton. *Machinery* (London), v. 74, June 30, 1949, p. 889-895.

Use in die casting in cases in which the work must be cast with undercuts which make ejection from a solid core impracticable.

14C-60. Die Casting Hinged Assemblies. Newman Field. *Machinery* (London), v. 74, June 30, 1949, p. 895-896.

Novel die-casting technique introduced in 1948 by J. R. Schuchardt, of New York, for production, in a single shot, of die-cast assemblies consisting of two or more parts hinged to one another. The method is in commercial use for production of zipper fastener sliders. Other applications.

14C-61. Research Will Advance Brass and Bronze Foundry Practice. Austen J. Smith. *American Foundryman*, v. 16, July 1949, p. 44-49.

Previously abstracted from *Foundry Trade Journal, and Engineering*, items 14C-58, 1949.

14C-62. ASARCO's Continuous Casting Process. *Engineering and Mining Journal*, v. 150, July 1949, p. 145.

Process developed by American Smelting & Refining Co. at Perth Amboy, N. J. Applied to Cu-base alloys, it not only simplifies the production of accurately-dimensioned castings, but imparts greater strength and hardness than other conventional processes. It also permits casting of shapes in lengths hitherto not possible by usual methods.

14C-63. Precision Casting of Copper-Base Alloys at Warren Foundry. Fred M. Burt. *Western Metals*, v. 7, July 1949, p. 30-31.

14C-64. Bronze Foundry Practice; Problems Relating to the Mechanics of Solidification. Austen J. Smith. *Metal Industry*, v. 75, July 1, 1949, p. 10-13.

Previously abstracted from *Foundry Trade Journal*, and *Engineering*, item 14C-58, 1949.

14D—Light Metals

14D-37. Some Notable Aluminium-Alloy Castings. A. R. Martin. *Engineering*, v. 168, July 1, 1949, p. 21-23; July 8, 1949, p. 45-46. A condensation.

A variety of complex sand and die castings. Chosen to illustrate, not only the specialized technique and metallurgical control necessary for production of high-strength Al-alloy castings, but where possible, points of interest relating to die design and the construction of pattern and core-box equipment. Two binary Al alloys containing 10% Mg and 4½% Cu, respectively, were used.

14D-38. Casting Light Alloys. *Metal Industry*, v. 75, July 1, 1949, p. 3-6.

Procedures and equipment of British plant.

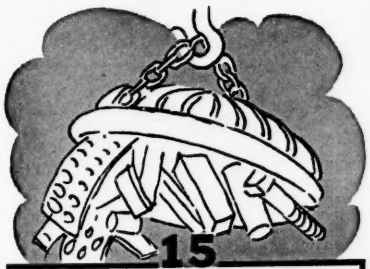
14D-39. Diecasting Auto Inner Door Frames in Aluminum. W. G. Patton. *Iron Age*, v. 164, July 21, 1949, p. 90-93.

14D-40. Pimpling of Aluminum Die Castings. R. A. Quadt and D. L. LaVelle. *Die Castings*, v. 7, Aug. 1949, p. 26-29.

Sometimes results when castings are subjected to elevated temperatures, and is largely caused by air mechanically trapped and compressed when the casting is produced. Influencing factors and pimpling tests.

14D-41. Die-Cast Aluminum Automobile Door Expected To Cut Assembly Costs. *Steel*, v. 125, Aug. 1, 1949, p. 93.

For additional annotations indexed in other sections, see:
20C-16; 21C-4; 24C-12



SCRAP and BYPRODUCT UTILIZATION

15-53. Future Sources of Iron Units in Scrap. Charles R. Holton. "Yearbook of the American Iron and Steel Institute, 1948", p. 346-355; discussion, p. 355-367.

Previously abstracted from *Steel*, item 15B-44, 1948.

15-54. Selby Plant Makes Liquid SO_2 From Waste Smelter Gases. *Engineering and Mining Journal*, v. 150, July 1949, p. 138.

Plant of American Smelting and Refining Co.

15-55. Treatment of Plating Mill Wastes. M. U. Priester. *Iron Age*, v. 164, July 14, 1949, p. 105-106.

The wastes consist of rinses from cyanide baths; Cu, Al, and Ni plating and highly alkaline solutions containing substantial amounts of suspended solids, oils, and greases.

15-56. Steel Drum Reconditioning Performed on Specially-Designed Equipment. William J. Miskella. *Steel*, v. 125, Aug. 8, 1949, p. 73-74, 76.

Procedures and equipment which are developed to a high degree of efficiency. Several interesting cleaning, painting, and inspection operations.

15-57. Lower Cost Aluminum Die Castings Possible Through Use of Scrap Metal. James H. Hammett. *Materials & Methods*, v. 30, Aug. 1949, p. 72-74.

Large producer of die castings has made substantial savings without sacrifice in quality by direct use of reclaimed Al scrap.

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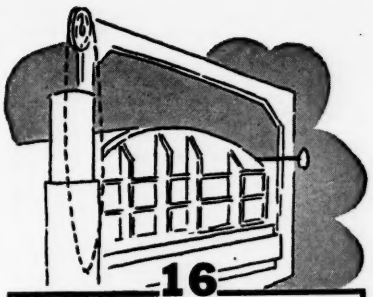


FURNACES and HEATING DEVICES

16A—General

16A-66. Utilization of Secondary Energy Resources in the Metal Industry. (In Russian.) E. A. Nitskevich. *Promyshlennaya Energetika* (Industrial Power), v. 6, Mar. 1949, p. 7-11.

Comprehensive study of the present status of utilization of secondary-energy resources in ferrous and nonferrous metallurgy in the USSR. Basic problems involved in utilization of such energy. Means of improving utilization and limits of practicality.

16A-67. Fundamental Data for Induction and Dielectric Heating. Part II. *Industrial Heating*, v. 16, July 1949, p. 1188, 1190, 1192, 1194.

Basic formulas involved in the calculation of various quantities connected with radio-frequency and induction-heating problems. Physical constants of metals commonly used in calculations relating to induction heating.

16A-68. Vaporized Oil as a Standby Fuel on a Gas-Fired Mold Drying Oven. J. E. Klika. *Industrial Heating*, v. 16, July 1949, p. 1246, 1248-1250.

Equipment for use.

16A-69. Modern Core Ovens. Charles H. Barnett. *Industrial Gas*, v. 28, July 1949, p. 16-17, 25-26.

16A-70. Heating Systems for Stoving Ovens. 1. The Case for Gas. *Electroplating and Metal Finishing*, v. 2, July 1949, p. 449-465.

Gas as fuel. Matters affecting choice of convector or radiant heating systems to suit requirements.

16A-71. High Speed Heating Machines. *Automotive Industries*, v. 101, Aug. 1, 1949, p. 29.

Use of induction heating for three different jobs in different plants—scale removal, surface hardening, and soldering.

16A-72. Theory of Calculation of the Radiation of Furnace Elements. (In Russian.) *Kotloturbostroenie* (Boiler and Turbine Manufacture), Mar.-Apr. 1949, p. 1-4.

Critically analyzes, on the basis of theoretical and experimental investigation, two formulas for the above, one proposed by Timofeev and the other by Gurvich. Data of investigation indicate that the latter formula, based on the theory similarity, is verified by most existing experimental data and indicates correctly the character of dependence of gas temperature on basic parameters of combustion.

16A-73. (Book) Induction Heating. N. R. Stansel. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y. $3.50.

A technical discussion of electrical and thermal principles of the above use of eddy currents for heating service. Complete details and illustrations are given on coil

design for surface hardening and for melting metals. Installation of power-circuit conductors. Electrical resistivities of metals and alloys, and the resistance ratios of round and square copper conductor tubes.

16B—Ferrous

16B-74. Improved Heat Treating at Standard. *Baldwin,* v. 5, 1st and 2nd qtr., 1949, p. 13-15.

Rotary heat treating furnace was designed for the controlled heating of individual steel ingots preparatory to press forging them into blooms and blanks in the primary steps of producing wrought-steel wheels for railroad and industrial service.

16B-75. De koepeloven. (The Cupola Furnace.) M. Stap. *Metalen,* v. 3, May 1949, p. 196-205.

Construction, the melting process and the gases formed during the melting operation.

16B-76. Flow of Gases in Open-Hearth Furnaces. *Refractories Journal,* June 1949, p. 193-195. Based on paper by J. H. Chesters.

Control of roof temperature and damage due to dust carried up from the charge.

16B-77. Gas-Fired Litho Ovens Speed Can Production. Arthur Q. Smith. *Industrial Heating,* v. 16, July 1949, p. 1236-1238, 1240, 1242-1244.

16B-78. The Effect of High Coke Oven Gas Firing on Open Hearth Operation. J. Jaicks. *Blast Furnace and Steel Plant,* v. 37, July 1949, p. 808-812.

It was found that coke-oven gas can be fired in sizable amounts throughout the entire heat cycle without furnace damage; that the gas can be substituted for fuel oil with few adverse effects up to a certain point; and that the slight increases in sulfur contamination were insufficient to disqualify any appreciable portion of the heats. Optimum amount of gas was that furnishing about 30% of the total Btu. input.

16B-79. Coke Quality. Its Effect on Cupola Operation. W. J. Driscoll. *Iron and Steel,* v. 22, July 1949, p. 349-353.

Effects of variations in coke. Some coke properties, using a diagrammatic representation of combustion reactions taking place in the cupola and of the gas analyses and temperatures resulting therefrom. 24 ref.

16B-80. Ingot to Coiled Hot Strip in Six Minutes. Dan Reebel. *Steel,* v. 125, July 25, 1949, p. 67-68, 70.

New oscillating roller-type hearth furnace recently completed.

16B-81. Comparative Advantages of Modern Soaking Pits. E. A. Brown, Jr. *Steel,* v. 125, Aug. 15, 1949, p. 94-96, 127-128, 130, 132.

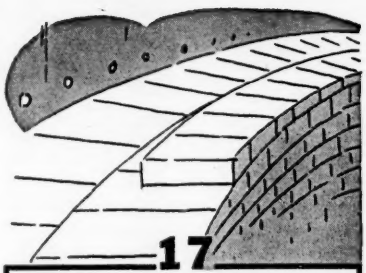
Factors to consider in the selection of soaking pits. Firing details of the six principal standard types.

16D—Light Metals

16D-2. Ein rinnenloser Netzfrequenz-Induktionstiegelofen zum Schmelzen von Magnesiumlegierungen. (A Channelless Polyphase High-Frequency-Induction Crucible Furnace for Melting Magnesium Alloys.) Gerhart Hennicke and Philipp Schneider. *Die Neue Giesserei,* v. 36 (new ser., v. 2), June 1949, p. 172-182.

Reasons for developing this new furnace and its principles of design and operation. Comparison with other furnaces.

For additional annotations indexed in other sections, see:
14B-83; 18B-127; 19B-150



17 REFRACTORIES and FURNACE MATERIALS

17-68. Factors in Service Behavior of Silica Brick. L. A. Smith. "Yearbook of the American Iron and Steel Institute, 1948", p. 392-405; discussion, p. 405-414.

Previously abstracted from *Blast Furnace and Steel Plant,* item 17-59, 1948.

17-69. Basic Brick in the Open Hearth Furnace. Vernon W. Jones. "Yearbook of the American Iron and Steel Institute, 1948", p. 415-424; discussion, p. 425-428.

Previously abstracted from *Blast Furnace and Steel Plant,* item 17-68, 1948.

17-70. Properties and Performance of Open Hearth Bottoms. H. M. Kraner. "Yearbook of the American Iron and Steel Institute, 1948", p. 429-451; discussion, p. 452-457.

Previously abstracted from *Industrial Heating,* item 17-14 and 17-36, 1949.

17-71. Some Considerations in the Use of Carbon Refractories in Blast Furnaces. W. S. Debenham. "Yearbook of the American Iron and Steel Institute, 1948", p. 458-474.

Previously abstracted from *Steel,* item 17-67, 1948.

17-72. Operating Properties of Crown Dinas Brick (Physico-Chemical Factors Determining Ability of Dinas Brick to Expand During Firing of an Openhearth Furnace). (In Russian.) I. S. Kainarskii and V. D. Tsigler. *Ogneupory* (Refractories), v. 14, Mar. 1949, p. 125-136.

Factors affecting the workability of Dinas brick when used in the crown of a furnace. The ability to expand during heating is the most important quality for proper functioning and durability. Optimum chemical compositions. Comparative data for different types. 23 ref.

17-73. A Study of Silica Refractories by Torsion Methods. S. S. Das and A. L. Roberts. *Transactions of The British Ceramic Society,* v. 48, July 1949, p. 215-228; discussion, p. 228-234.

Torsion tests on two types of commercial silica refractories up to 1620° C. showed that pronounced changes occurred in mechanical properties on heating. Results emphasize the characteristically high load-bearing capacity of silica and point to a unique relationship between crystals and matrix, which needs further exploration. They also suggest that silica is most liable to spall at temperatures somewhat below the cristobalite inversion range.

17-74. Chemical Changes in Basic Brick During Service. T. F. Berry, W. C. Allen, and R. B. Snow. *Industrial Heating,* v. 16, July 1949, p. 1254, 1256. A condensation.

The influence of the diffusion of iron oxide into the periclase crystals adjacent to the hot face of basic brick during service in an openhearth furnace, and subsequent growth of these crystals, is believed to have a greater influence upon the peeling of the hot face than the growth of the original chrome crystals.

17-75. Disintegration Test Equipment for Refractories. J. A. Shea. *Industrial Heating,* v. 16, July 1949, p. 1262, 1264. A condensation.

Previously abstracted from *Iron and Steel Engineer,* item 17-35, 1949.

17-76. Blast Furnace Brick Disintegration Test Equipment and Test Procedure. J. A. Shea. *American Ceramic Society Bulletin,* v. 28, July 15, 1949, p. 253-259.

Semiautomatic equipment and procedure. Essentially, the equipment consists of a gas-tight chamber to hold the test specimens, a suitable furnace for heating the chamber, a pump for circulating CO over the specimens in a closed system, absorption tubes to remove CO_2 and moisture from the circulating gas, and a flowmeter and pressure gage. The brick specimens are heated to 950° F. and then exposed to the action of a 20 cu. ft. per hr. flow of CO for 40 hours.

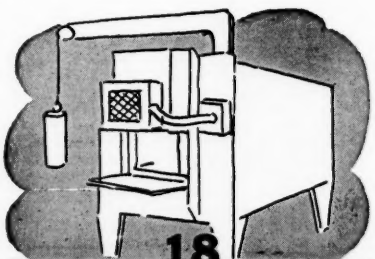
17-77. Physical Properties at Elevated Temperature of Seven Hot-Pressed Ceramics. James J. Gangler, Chester F. Robards, and James E. McNutt. *National Advisory Committee for Aeronautics,* Technical Note 1911, July 1949, 33 pages.

Investigation to determine elevated temperature, short-time tensile strength, relative resistance to thermal shock, coefficient of thermal expansion, and density. Includes B_4C, TiC, ZrC, 85% SiC plus 15% B_4C, zircon, and stabilized zirconia. TiC was the most promising for possible gas-turbine application because of high tensile strength at elevated temperatures and superior resistance to thermal shock. 11 ref.

17-78. High Temperature Properties of Magnesia Refractories. J. C. Hicks and Ben Davies. *Iron Age,* v. 164, Aug. 11, 1949, p. 98-105, 157-158.

Prolonged exposure of a high-purity magnesia refractory to 3800° F. produces significant changes in chemical and mineralogical character and in physical and thermal properties. A detailed analysis of these changes, correlating quantitative physical and thermal property data.

For additional annotations indexed in other sections, see:
14B-83



18 HEAT TREATMENT

18A—General

18A-25. Planned Heat Treating. *Canadian Metals and Metallurgical Industries,* v. 12, July 1949, p. 12-13, 32-33.

For cutting tools.

18A-26. Heat Treating: Hot Prospect for Cold-Cash Savings. *Modern In-*

dustry, v. 18, July 15, 1949, p. 54-56, 58, 60, 62, 64.

New methods and equipment and their applications.

18B—Ferrous

18B-119. Entfestigungsgluhen verschiedenartig erschmolzener kohlenstoffarmer Bandstähle im Durchziehofen. (Stress-Relief Annealing in the Continuous Annealing Furnace of Low-Carbon Strip Steels Melted by Different Methods). Anton Pomp, Jacques Brockhaus, and Georg Niebch. *Archiv fur das Eisenhuttenwesen*, v. 20, May-June 1949, p. 199-204.

Strength properties of five cold rolled stress-relief-annealed strip steels compared with those of similar steels stress-relieved by customary methods.

18B-120. Planning a Cyanide Heat Treating Layout. P. D. Lilly. *Steel Processing*, v. 35, June 1949, p. 323-325.

Basic layout diagram, also diagrams of the furnace and of workholding jigs. Loading and unloading, preliminary degreasing, oil cooling and neutralization of swill water.

18B-121. Induction Hardening Successfully Applied to Large Steel Bearing Races. R. H. Lauderdale. *Materials & Methods*, v. 30, July 1949, p. 57-60.

How scale-free, hard-wearing roller path surfaces with practically no distortion were obtained using high-frequency surface hardening.

18B-122. Some Influencing Factors in Tool Steel Heat Treatment. E. J. Pavesic. *Tool Engineer*, v. 23, July 1949, p. 32-33.

Recommendations for best results.

18B-123. Cooling of Quenching Oils. C. L. Ringquist and L. J. Hess. *Heating and Ventilating*, v. 46, July 1949, p. 49-56.

Heat treating and quenching of steel with particular emphasis on temperature control in the quenching bath.

18B-124. Heat-Treating Steel Parts for Allison Jet Engines. E. P. Zink. *Machinery*, v. 55, July 1949, p. 142-151.

Techniques developed for hardening, carburizing, and nitriding.

18B-125. The Action of Boron in Hardening Steel. Leon D. Gruberg. *Canadian Metals and Metallurgical Industries*, v. 12, July 1949, p. 20-21, 34.

Reports investigation. It is shown that the action of boron in increasing the hardenability is due entirely to a solid-solution effect at heat-treating temperatures.

18B-126. Flame Hardening Large Gears. Paul A. Furkert. *Industrial Heating*, v. 16, July 1949, p. 1172-1174.

Advantages are illustrated by a detailed description of experiences of two manufacturers.

18B-127. Case Hardening Automobile Parts. Martin Neumeyer. *Iron Age*, v. 164, July 14, 1949, p. 100-104.

Already applied to the case hardening of more than 150 different types of parts, including stampings, screw-machine parts and forgings, the controlled-atmosphere furnace described has effected substantial savings.

18B-128. Induction Heating Ninety-Four Typewriter Parts Per Hour. *Steel*, v. 125, July 18, 1949, p. 118.

Semiautomatic operation.

18B-129. Localized Heat Treatment. William F. Sorrenson. *Iron Age*, v. 164, July 28, 1949, p. 52-57.

Construction features of a simple rotary flame heating machine, adaptable to a wide variety of sizes and shapes of work pieces. The equipment can be utilized for local annealing as well as for heating and subsequent quenching.

18B-130. How To Heat-Treat Spur Gears by Induction Heating. J. A. Redmond. *American Machinist*, v. 93, July 28, 1949, p. 83-94.

"Special Report" gives extensive information by means of text, graphs, diagrams, and photographs. Equipment, procedure, and metallurgical results.

18B-131. Flame Hardening. *Welding Journal*, v. 28, July 1949, p. 641. Reprinted from *Tempil Topics*, Apr. 1, 1949.

Process, its principles, and applications.

18B-132. Cereedschapstaal. (Toolsteels.) F. van Wijk. *Centraal Instituut voor Materiaal Onderzoek Afdeling Metalen*, Feb. 1949, p. 10-13.

Toolsteel field with special attention to modern heat-treatments, such as martempering, austempering and subzero treatment. Classification according to properties, as proposed by Carpenter Steel Co., is preferred over one by chemical composition. Methods of testing steels are briefly discussed.

18B-133. Influence of Microfissures Formed During Hardening on Properties of Steel. (In Russian.) V. A. Pavlov and M. V. Yakutovich. *Zhurnal Tekhnicheskoi Fiziki* (Journal of Technical Physics), v. 19, Apr. 1949, p. 471-480.

Investigated for a steel with and without microfissures. Mechanical properties of both types, annealed to 200, 300, 400, 500, 600 and 700° C. were studied during application of torsional force. Presence of microfissures decreases values of maximum relative shear by 90% at annealing to 200° C. and by 25-30% at temperatures between 400 and 600° C. After annealing to above 650° C., plastic properties of both specimens are identical.

18B-134. Application of Isothermal Treatment for Increasing the Strength of Structural Steel. (In Russian.) L. M. Pevzner. *Zhurnal Tekhnicheskoi Fiziki* (Journal of Technical Physics), v. 19, Apr. 1949, p. 481-491.

Experimental data indicate that isothermal treatment, causing formation of bainite, permits considerable increase in the structural strength of some steels. Steel with a bainite structure possesses considerably higher strength than the same steel with low-annealed martensite or sorbite structure.

18B-135. Rate of Cooling During Quenching as Related to Through-Hardenability of Steel. (In Russian.) M. E. Blanter. *Zavodskaya Laboratoriya* (Factory Laboratory), v. 15, May 1949, p. 557-566.

Problem investigated, indicating the influence of various factors including shape and size of piece being quenched. A new method for determining optimum conditions of quenching applicable on an industrial scale. Folded nomographic chart relates these factors and permits rapid determination of optimum quenching conditions.

18B-136. Analytical Method for Calculation of Conditions for Annealing of Steel. (In Russian.) G. N. Kozlovskii. *Zavodskaya Laboratoriya* (Factory Laboratory), v. 15, May 1949, p. 567-569.

Modifies and applies Kazeev's equation for physicochemical processes to calculation of the many factors in annealing of steel. Results of sample calculations for carbon and low-alloy steel.

18B-137. Heat Treating Theory and Practice. A. M. Hall. *Metals Review*, v. 22, July 1949, p. 5-8.

New developments reported in literature of the past 12 months. Confined to ferrous metals and alloys. Theory of austenite transformation and toolsteel treatment. Practical developments are in high-speed gas heating, induction, case hardening, and atmosphere control. (References to "A. S. M. Review of Current Metal Literature".)

18B-138. A Critical Review of the Nitriding Process. Part II. Lester F. Spencer. *Steel Processing*, v. 35, July 1949, p. 375-380, 382, 390.

Concludes review of the literature. Characteristic microstructures of nitrided surfaces. 47 ref.

18B-139. The Influence of Heating Rate in Malleable-Iron Annealing. S. W. Palmer. *Engineering*, v. 168, July 15, 1949, p. 69-72. A condensation.

Rate of heating has an important influence after the top annealing temperature has been reached, and the final microstructure obtained depends to a considerable extent upon the rate of heating.

18B-140. Practical Pointers on Steel Treating. Part VIII. *Modern Machine Shop*, v. 22, Aug. 1949, p. 114-116, 118, 120, 122, 124, 126, 128.

Recommended methods for properly heat treating high-speed steel.

18B-141. Continuous Selective Hardening of Hopper-Fed Cylindrical Parts. *Production Engineering & Management*, v. 24, Aug. 1949, p. 50.

Uniformity of case depth, with automatic work handling and at feed rates up to 6 in. per sec., is obtained with radio-frequency hardening system.

18B-142. Recent Heat-Treatment Developments. *SAE Journal*, v. 57, Aug. 1949, p. 56-57.

Summarizes four papers presented at SAE National Passenger Car, Body, and Production Meeting, Detroit, Mar. 9, 1949: "Heat-Treatment Atmospheres", O. E. Cullen; "Gray Iron Heat-Treatment", C. F. Joseph; "Induction Heating", A. W. Herbenar; and "Salt Bath Heat-Treatments", L. B. Rosseau.

18B-143. Gray Iron Parts Successfully Surface-Hardened in the Flask. A. P. Alexander. *Materials & Methods*, v. 30, Aug. 1949, p. 58-59.

Unique method for hardening gray iron at the time of casting which produces satisfactory surface hardness at lower cost than by other methods.

18B-144. Oil Rig "Kelly" Rods Toughened by Controlled Manufacturing Methods. *Steel*, v. 125, Aug. 1, 1949, p. 90, 93.

Controlled processes center around alternate heating, forging, and close inspection techniques. A "Kelly" is the steel link that picks up the driving power of an oil rig's engines and transmits it to the drill string.

18B-145. Versatility of Oxyacetylene Flame-Hardening. J. T. Howat. *Steel*, v. 125, Aug. 8, 1949, p. 64-67, 94.

Various examples of production flame-hardening setups. Procedures for various types of steels and ways to prevent typical heat treating defects from occurring as a result of the high-temperature local heat sources being applied.

18B-146. Homogeneous Carburizing. Orville E. Cullen. *Iron Age*, v. 164, Aug. 11, 1949, p. 83-87, 130, 132.

A through-carburizing technique that makes possible the fabrication of medium and high-carbon steel parts from low-carbon steel stock. The process and existing and potential practical applications.

18C—Nonferrous

18C-7. Investigation of Conditions of Titanium Carbonization. IV. G. A. Meerson and Y. M. Lipkes. *National Advisory Committee for Aeronautics*, Technical Memorandum 1235, July

1949, 13 pages. Translated from *Zhurnal Prikladnoi Khimii* (Journal of Applied Chemistry), v. 18, no. 4-5, 1945.

Thermodynamic calculations confirming results of previous experiments at atmospheric pressure and additional experiments at reduced pressures.

18C-8. The Bright Annealing of Copper in Continuous Controlled Atmosphere Furnace. J. H. Bradley and H. J. Hammond. *Industrial Heating*, v. 16, July 1949, p. 1158-1161, 1292.

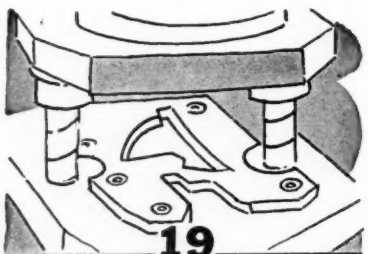
As applied to wire, strip, and bar stock of copper and nonferrous Cu alloys.

18C-9. Some Factors Affecting the Rate of Precipitation Hardening in Cu-Be Alloys. Paul A. Beck. *Journal of Applied Physics*, v. 20, July 1949, p. 666-668.

It was found that the lower peak hardness and faster overaging of a Co-containing Cu-Be alloy quenched from a low solution-treating temperature is associated with a large amount of grain-boundary precipitation. A similarly large amount coupled with low peak-hardness is obtained if the alloy contains a small amount of Cr impurity, even if the quenching temperature is normal.

For additional annotations indexed in other sections, see:

2C-42; 3B-152; 4B-69; 21A-38; 21C-4



19 WORKING

19A—General

19A-172. Requirements of Drawing Compounds. James McElgin. *Steel Processing*, v. 35, June 1949, p. 306-309.

New types now available.

19A-173. Precision Forging of Temperature-Resistant Jet-Engine Blades. C. H. Smith, Jr. *Machinery* (American), v. 55, July 1949, p. 160-167.

Techniques employed in forging tough alloys that resist deformation even at high temperatures.

19A-174. Thin Wall Bearings; An Important Production Development by Glacier Metal Co., Ltd. *Automobile Engineer*, v. 39, July 1949, p. 265-267.

Novel method and equipment for production of bimetal shell bearings. The method used consists essentially of rolling the lining strip to the proper form using a continuous automatic three-roll system.

19A-175. New Lock-Making Plant Features Intricate Operations. Hugh G. Jarman. *Canadian Metals and Metallurgical Industries*, v. 12, July 1949, p. 14-15, 33-34.

Plant, working and machining equipment and operations.

19A-176. Designing Extrusion Dies for Complicated Sections. Carl Dovano. *Tool Engineer*, v. 23, July 1949, p. 38-39.

Recommended procedures.

19A-177. Calculations for Producing a Rectangular Lid. L. X. Nepomuceno. *Sheet Metal Industries*, v. 26, July 1949, p. 1452-1454.

Formulas of a general nature for the forming of lids of arbitrary dimensions.

19A-178. A Practical Workshop System for the Care and Maintenance of Press Tools. (Continued.) W. M. Halliday. *Sheet Metal Industries*, v. 26, July 1949, p. 1481-1487.

Design and use of sectional or built-up punches and with certain specific types of these punches. Maintenance and construction requirements. (To be continued.)

19A-179. Fast Lighting Fixture Production Featured at Columbia Electric & Mfg. Co., Spokane, Wash. Howard E. Jackson. *Modern Industrial Press*, v. 11, July 1949, p. 20, 22, 26, 28, 34.

Fast production in the manufacture of commercial and industrial fluorescent lighting fixtures can be achieved by employing many conventional factory-made presses, and some unconventional shop-made presses.

19A-180. Why Hydraulic Presses? *Modern Industrial Press*, v. 11, July 1949, p. 44, 46, 48, 50-51. Based on article by Herbert Chase in *News Reel* (Hydraulic Press Mfg. Co., Mt. Gilead, Ohio.)

The case for the hydraulic press in comparison with mechanical-type presses in the working of sheet metal.

19A-181. New Developments Aid Western Presswork. Thomas A. Dickinson. *Steel Processing*, v. 35, July 1949, p. 359-361, 387.

At various Western plants.

19A-182. Accurate Blanks Without Dies. John J. Murphy. *Steel*, v. 125, July 25, 1949, p. 65, 93.

Production on rugged squaring shears equipped with a precision gaging system.

19A-183. An Analysis of Blanking Die Designs. Part V. C. W. Hinman. *Modern Machine Shop*, v. 22, Aug. 1949, p. 90-92, 94, 96.

Both conventional and inverted compound blanking and perforating dies.

19A-184. Fundamentals of Compression Bending. Ralph M. Shaw, Jr. *Tool Engineer*, v. 23, Aug. 1949, p. 21-22.

Compression process in which the die is stationary and the roll wipes the piece being bent into the die. Draw, roll, and ram processes.

19A-185. Jets, Turbines Demand New Forging Methods. *SAE Journal*, v. 57, Aug. 1949, p. 67. Based on "Forging of High-Temperature Alloys", by L. S. Fulton.

Recommended procedures. Compositions of eight Fe-base, four Ni-base, and six Co-base high-temperature alloys.

19A-186. Ball-Broaching Gears and Bushings for Aircraft Engines. R. C. Barron. *Machinery*, v. 55, Aug. 1949, p. 147-151.

Method for secure assembly of bushings in the bores of aircraft-engine reduction gears, pinions, and other parts. It provides a means of securing bushings that entirely eliminates the use of pins, keys, splines, and other fastening devices. Essentially, the process consists of pressing through the bore of the part, a tool containing a number of hardened steel balls located tangent to each other and free to revolve in an annular race. Plastic flow of metal, caused by the rolling action of the balls, produces round-bottomed furrows 0.0005-0.0015 in. deep, and metal is raised 0.0003-0.0005 in. above the bore surface at each side of the furrows. No cutting or shearing action occurs, nor is the broached surface weakened in any way. On the contrary, the cold working increases strength and hardness.

19A-187. Straightening of Coil Stock for Press Operations. P. E. McKeith. *Tool & Die Journal*, v. 15, Aug. 1949, p. 49, 52, 54.

Recommended procedures and equipment.

19A-188. Automatic Crimping Boosts Production. *Tool & Die Journal*, v. 15, Aug. 1949, p. 50-51.

Set-up for crimping thin metal tubes to ceramic insulators, a critical operation in producing neon-sign electrodes.

19A-189. What To Watch in Shaving-Die Design. J. R. Paquin. *American Machinist*, v. 93, Aug. 11, 1949, p. 102-104.

Blanked parts must be shaved to produce smooth precise edges for many requirements. Design requirements for the dies.

19B—Ferrous

19B-138. Huge Hammer Anvils Forged at Homestead Works, CIS. John C. McComb. *Steel Processing*, v. 35, June 1949, p. 291-293.

Forging by above works of a 142-ton anvil for a 12,000-lb. forging hammer. This is believed to be the largest hammer base produced by this method.

19B-139. The Drop Forge Industry Today; A Look Ahead. Part II. Robert E. W. Harrison. *Steel Processing*, v. 35, June 1949, p. 320-322.

Present status and future prospects.

19B-140. Multiple-Action Press Tool for Air Cleaner Casings. *Machinery* (London), v. 74, June 30, 1949, p. 879-880.

Used on 0.024-in. mild-steel sheet.

19B-141. New $18,000,000 Rolling Mill for Sheet and Strip Stainless Steel. *Machinery*, v. 55, July 1949, p. 210-211.

New mill at Midland, Pa., works of Crucible Steel Co. of America.

19B-142. Press Work at Inglewood. James Corcoran. *Western Machinery and Steel World*, v. 40, July 1949, p. 76-77.

Equipment and procedures. The largest lighting-fixture manufacturer in the West and one of the largest producers of standard and trailer sinks and lavatories, the company does a large business in contract fabrication, stamping, and porcelain enameling.

19B-143. Extrusions Last Longer, Cost Less Than Forgings. *SAE Journal*, v. 57, July 1949, p. 43-47. Based on "The Application of Hot Extrusion Methods for Automotive Production", by Claud L. Stevens and Gosta Vennerholm.

Comparative properties of automotive front-wheel spindles made by the two methods. Numerous advantages of extrusion. Includes reply to discussion by R. A. Mitchell and T. A. Hewson, but not the original discussion.

19B-144. Rolls and Rolling. Part VII. E. E. Brayshaw. *Blast Furnace and Steel Plant*, v. 37, July 1949, p. 821-830.

Roll passes for producing round bars. Various combinations. (To be continued.)

19B-145. Well-Engineered Press Set Up Makes Two Fenders At Once. P. D. Aird. *Modern Industrial Press*, v. 11, July 1949, p. 13-14, 18.

19B-146. Forging and Heat Treating of Oil Well Sucker Rods. *Industrial Heating*, v. 16, July 1949, p. 1164-1166, 1168, 1184.

Procedures and equipment.

19B-147. Carnegie-Illinois Modernizes Cold-Reduced Sheet and Tin Plate

Production at Gary. *Industrial Heating*, v. 16, July 1949, p. 1204-1206, 1208, 1210, 1212.

19B-148. Pipe-Hungry Industries Welcome New Texas Fabricating Company. *Western Metals*, v. 7, July 1949, p. 28-29.

Procedures and equipment for fabrication of large-diameter steel pipe by forming and welding.

19B-149. Huge Press Stamps Out 260 Flywheels Per Hour. *Automotive Industries*, v. 101, Aug. 1, 1949, p. 46.

2000-ton press, recently installed at Pontiac Motor Division.

19B-150. Recent Developments in Steel Processing. J. A. Kilby and W. G. Cameron. *Transactions of the Institution of Engineers and Shipbuilders in Scotland*, v. 91, 1948, p. 81-135; discussion p. 135-139.

An earlier paper dealt with the manufacture of the steel ingot; the present paper, rolling of the ingot into the many and varied forms in which it is supplied to the steel-consuming industries. Construction of heating and reheating furnaces and rolling equipment. 171 ref.

19B-151. Applications of Hot Extrusion Methods. Claud L. Stevens and Gustav Vennerholm. *Steel Processing*, v. 35, July 1949, p. 363-367.

See abstracts from *SAE Journal*, and *Steel*, item 19B-143, and 19B-65, 1949.

19B-152. Use of Transfer Type Presses in the Production of Electric Cookers. B. E. Schroeder. *Machinery* (London), v. 75, July 21, 1949, p. 83-87.

19B-153. Effect of Plastic Strain and Heat Treatment. C. J. Osborn, A. F. Scotchbrook, R. D. Stout, and B. G. Johnston. *Welding Journal*, v. 28, Aug. 1949, p. 337s-353s.

Progress report No. 3 on the effect of fabrication processes on steels used in pressure vessels. Effects on the tensile and notch properties of a rimmed and a killed steel.

19B-154. Cold Shaping Steel. *Steel*, v. 125, July 25, 1949, p. 58-60, 94, 96, 99; Aug. 1, 1949, p. 74-77.

Practicability for low-carbon steels by extrusion with the aid of special surface treatments. Processes in terms of both industrial and ordnance applications. Phosphatizing processes and their importance in facilitating the above.

19B-155. Hobbing Cavities in Alloy Steels. John Sekowski. *Tool & Die Journal*, v. 15, Aug. 1949, p. 42-44.

Selection of alloys, safety precautions, and hob design.

19B-156. New Stainless Steel Division of the American Steel & Wire Co. *Machinery*, v. 55, Aug. 1949, p. 165.

Equipment for production of stainless-steel wire ½ in. in diameter and finer, as well as certain sizes of flat wire.

19B-157. When To Use Steel Drop Forgings for Stressed Parts. Kenneth Rose. *Materials & Methods*, v. 30, Aug. 1949, p. 63-65.

Redesigning highly stressed parts for drop forging often results in closer tolerances and reduced weight while still meeting the same strength requirements.

19B-158. New Cut-Wire Shot Big Boon to Peening. H. H. Miller. *SAE Journal*, v. 57, Aug. 1949, p. 44-51.

Shot is made by cutting MB hard-drawn mechanical spring wire into lengths which are equal to the diameter. Most of the experience to date is with shot made from 20-gage wire, although larger and smaller sizes are available. Peening is said to have been a costly and comparatively uncontrollable operation because of excessive shot usage, short life, grit formation, and lack of size and quality uniformity of the shot. Experience with above shot for peening automotive chassis springs indicates that these drawbacks are overcome.

19B-159. Pacific Coast Plant Extends Barmaking Facilities. R. J. Tremblay. *Steel*, v. 125, Aug. 1, 1949, p. 96, 98, 100.

New mill with 21 horizontal stands and equipped with phenolic-resin type bearings. Handling of coils.

19B-160. "Perfectly Shaped" Cones Produced by Plate Bending Roll. *Steel*, v. 125, Aug. 1, 1949, p. 103.

New method of forming cones in 1-in. steel plates.

19B-161. Cold Extrusion of Steel. T. E. Lloyd and E. S. Kopecki. *Iron Age*, v. 164, Aug. 4, 1949, p. 90-105.

New technique developed by Heintz Mfg. Co. for the Army. Original work was done by the Germans on deep-drawing carbon steel. However, the process has now been extended to high-carbon steels and various alloy steels containing Cr, Ni, Mn, and Mo. Information on die design, die lubricants, types of metals that can be extruded, and resulting physical properties. Particular emphasis is placed on die lubricants, the key to the success of this new process; and on improvement of metallurgical characteristics.

19B-162. Three Operations Produce Forming Dies from Locomotive Axles. *Steel*, v. 125, Aug. 8, 1949, p. 82.

Use of forging, flame-cutting and automatic submerged welding to convert scrap locomotive axles into large press dies for forming car parts.

19B-163. Spinning Stainless Parts. E. F. Ross. *Steel*, v. 125, Aug. 15, 1949, p. 90-92, 112.

Procedures and equipment for spinning parts such as tank bottoms, half spheres, bowls, strainers, covers for bottling machines, and steam-jacketed kettles.

19C—Nonferrous

19C-18. For Speed and Economy in Tube Drawing. *Light Metals*, v. 12, July 1949, p. 396-401.

First fully automatic, push-pointing, triple-draw, tube-drawing machine for production of brass and copper tubes.

19C-19. Wire Drawing of Some Non-Ferrous Metals. E. L. H. Bastian. *Wire and Wire Products*, v. 24, July 1949, p. 588-592, 626-629.

Various methods with emphasis on lubricants used for the different metals and methods.

19D—Light Metals

19D-46. Extrusion at Redditch. *Light Metals*, v. 12, July 1949, p. 382-387.

Extrusion process for the manufacture of light-alloy sections.

19D-47. Metal Requirements for Aluminum Presswork. J. W. Lengbridge. *Tool Engineer*, v. 23, July 1949, p. 40-45.

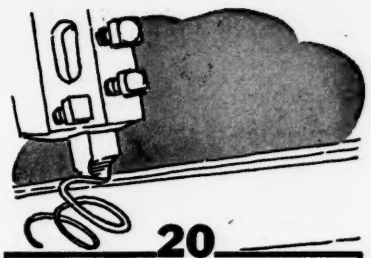
Concluding installment of a series on the theory and practice of pressing aluminum. Other sections are: metal requirements, selection of alloys, metal defects, and product defects.

19D-48. German-Built Aluminum Mill Produces for Permanente. James Joseph. *Western Metals*, v. 7, July 1949, p. 19-21.

Use of foil mill shipped from Germany, re-erected and modified.

For additional annotations indexed in other sections, see:

2C-42; 7B-165; 9-207-244; 19B-146; 21A-38; 21C-4



20 MACHINING and MACHINABILITY

20A—General

20A-307. Two-Component Dynamometers for Determination of Forces of Grinding. (In Russian.) M. I. Babchinitser. *Stanki i Instrument* (Machine Tools and Instruments), v. 20, Mar. 1949, p. 22-24.

Devices designed to determine tangential and radial forces simultaneously during mechanical grinding.

20A-308. Turning Commutators With Diamond Tools. J. B. Leece. *Industrial Diamond Review*, new ser., v. 9, June 1949, p. 165.

Small commutators (¾ in. diam. by ⅜ in. long) were turned using sintered carbide tools, but the costs were very high. After development of diamond tools, costs were cut and the commutators per tool increased from 200 to 10,000-40,000.

20A-309. Die Sinking for Drop Forging. Part III. Cutting Tools. John Mueller. *Steel Processing*, v. 35, June 1949, p. 301-305.

The variety of tools commercially available for machining or hand cutting hardened die blocks. Power machinery, abrasive wheels of various designs, polishing heads, files, boring heads, die-sinking machine cutters and "boss cutters", junior milling tools, and power machinery.

20A-310. The Utilization of Obsolete Lathes. P. E. Crome. *Machinery* (London), v. 74, June 30, 1949, p. 881-882.

20A-311. Bent Shank Tap Applied to Multiple Spindle Automatic. *Screw Machine Engineering*, v. 10, July 1949, p. 23-26.

Procedure for tooling steel hex nuts at the rate of 7200 gross pieces per hour, accomplished by removing feed gears and operating the automatic with the high-speed clutch engaged at all times.

20A-312. Chucking Automatic Successfully Produces Complex Part. *Screw Machine Engineering*, v. 10, July 1949, p. 28-31.

An eight-spindle automatic chucking machine. Advantages of taking multiple cuts in seven work stations with only one chucking of the part.

20A-313. Turret Lathe Practice. E. L. Murray. *Screw Machine Engineering*, v. 10, July 1949, p. 32-38.

"Tricks of the Trade" which add to successful turret-lathe operation.

20A-314. Pitfalls to Avoid in Tooling Screw Machines. XI. Noel Brindle. *Screw Machine Engineering*, v. 10, July 1949, p. 39-44.

More common knurling operations. Limitations on knurl widths and the effect of knurling on operation sequence.

20A-315. South Bend No. 2-H Turret Lathe. *Screw Machine Engineering*, v. 10, July 1949, p. 45-47.

The above has been redesigned.

20A-316. Tool Engineering Ideas. *Machinery*, v. 55, July 1949, p. 213-215.

"Boring Fixture That Eliminates Need for Scraping Operation", Rob-

ert Mawson; "Locking Wedges Reduce Die Breakage in Hardening", P. E. Redgrave; "Quick-Acting Toolmaker's Vise", Clifford T. Bower; and "Carbide Tools Last Longer in Piano Manufacture".

20A-317. Rubber Hydraulic Tooling. *Aircraft Production*, v. 11, July 1949, p. 215-217.

Several applications of the expanding principle to production equipment. Several types of mandrel employing the principle have been developed. Applications include gear grinding, fine boring. Method of manufacture of the mandrels is also outlined.

20A-318. Complete Package Grinding. James Blane. *Western Machinery and Steel World*, v. 40, July 1949, p. 64-67.

Custom-grinding shop.

20A-319. Precision Hinges for Aircraft. Gordon B. Ashmead. *Western Machinery and Steel World*, v. 40, July 1949, p. 72-75.

Unusual machine-shop equipment and procedures used in their manufacture.

20A-320. Shop Kinks. *Western Machinery and Steel World*, v. 40, July 1949, p. 99.

Die-maker's square, drill block, and ball drilling holder.

20A-321. Computing Torque, Thrust and Horsepower for Counterbores. G. F. Bush. *Tool Engineer*, v. 23, July 1949, p. 23-25.

As a result of a comprehensive series of tests, basic data required to compute the above were obtained. The studies were designed to show the relationship between torque, thrust and horsepower and diameter of the counterbore; diameter of the pilot; number of teeth; feed; speed; and material cut.

20A-322. Milling Cutter Design and Operation. (Concluded.) Mario Martellotti. *Tool Engineer*, v. 23, July 1949, p. 34-37.

Deals with oblique or true rake angle (a combination of radial, axial, and corner angle), and clearance angle (primary and secondary), also their selection and measurement. Values of oblique rake angle in face mills having 15, 30, and 45° chamfer angles; and clearance angles for various worked materials.

20A-323. Gadgets. *Tool Engineer*, v. 23, July 1949, p. 46-47.

"A 'Converted' Threading Tool", Arthur R. Christensen; "Hex Wrench Makes Handy Tool", Roger Isetts; "Quick Acting Drill Jig", Stanley R. Welling; "To Align Punches and Dies", John Turvene; "Simple Straddle Milling Fixture", Robert Mawson; "Redesigned Drill Adds Tool Life", Alex J. Precoda; and "To Determine Center of Gravity", Federico Strasser.

20A-324. Cutting Tubular Stock by the Bandsaw Method. H. J. Chamberland. *Western Metals*, v. 7, July 1949, p. 25-27.

20A-325. Metal Cutting and Machine Shop Productivity: Factors Determining Cutting Forces and Tool Wear; The Causes of Chatter Vibrations. A. J. Chisholm. *Machinery* (London), v. 75, July 7, 1949, p. 10-15; July 14, 1949, p. 51-53.

First article of the series (June issue) presented a general study of the characteristics of machined surfaces and of lubrication in the cutting process. Cutting forces, tool wear, and chatter vibrations are now considered, the latter in the concluding installment.

20A-326. Taper Milling Aircraft Parts. A. C. Slatter and J. J. Sloan. *Iron Age*, v. 164, July 14, 1949, p. 92-95.

Developed for contouring wing skins for high speed aircraft, and now being used for step and taper milling of spar webs, fuselage skins, and other structural members requiring thick edges, steps, straight tapers, or islands. Machining methods and design factors.

20A-327. Machine Shop Operations on Land-Rover Components. *Machinery* (London), v. 75, July 14, 1949, p. 39-47.

Third of a series of articles giving details of production of British agricultural and industrial vehicle.

20A-328. Drive Requirements of Machine Tools. Georg Schlesinger. *Machinery* (London), v. 75, July 14, 1949, p. 48-50.

As applied to drilling machines; milling machines; presses; and forging machines.

20A-329. Simple Equation Gives Machinability Values. James Sorenson and Marlowe Peters. *American Machinist*, v. 93, July 28, 1949, p. 95-96.

Formula based on many shop tests by means of which relative machinability of SAE steels using 18-4-1 high-speed tools can be determined quickly. Constants for the different SAE steels in different conditions.

20A-330. Sight At Your Fingertips. *American Machinist*, v. 93, July 28, 1949, p. 100-101.

Some simple, mechanical aids which provide new horizons for the blind technician and make it possible for him to do even "close" machineshop jobs accurately.

20A-331. Practical Ideas. *American Machinist*, v. 93, July 28, 1949, p. 102-106.

Includes the following: universal holder locks many tap sizes in turret lathe (R. B. Wolverhampton); tool align lathe bit for turning chamfers (Robert N. Adams); chuck swings boring toolbit in heavy, braced holder (Roy L. Derosia); press tool bends tubing (F. E. Riley); cutter rig on engine lathe bores long tubes smoothly (Fred H. Lingenfelder); layout tool can be used with precision gage blocks (Allan B. Nixon); simple torque wrench made from scrap-steel parts (Gerhard Wenke); hand-gun drill mills curved, irregular slots (Dan Penway); two toolposts double cutting power (Lyle C. Vinger); micrometer tool puts old measuring head to use (S. Framurz); double-flange winding arbor finishes heavy springs on lathe (J. R. Paquin); and other miscellaneous shop hints.

20A-332. Threading Speeds for Various Materials. *American Machinist*, v. 93, July 28, 1949, p. 117.

National coarse threads and the National fine series for various steels, irons, nonferrous metals and alloys, fiber, and bakelite.

20A-333. Taper Skin Milling—A New Machining Technique. A. C. Slatter and J. J. Sloan. *Automotive Industries*, v. 101, Aug. 1, 1949, p. 30-32, 62.

As applied to save weight by distributing the mass of metal where it is required to carry the load. Advantages and disadvantages.

20A-334. The Design and Construction of a 14-Ft. Gear Hobbing Machine. B. Barback. *Transactions of the Institution of Engineers and Shipbuilders in Scotland*, v. 91, 1948, p. 15-46; discussion p. 46-67.

20A-335. A New Trimming Fixture for Deep-Drawn Parts. H. Schlick. *Engineers' Digest*, v. 10, July 1949, p. 250. Translated and condensed from *Werkstatt und Betrieb*, v. 82, Feb. 1949, p. 58.

20A-336. The Production of Automatic Record Changers. *Machinery* (London), v. 75, July 21, 1949, p. 75-82.

Machine-shop equipment and procedures.

20A-337. A Light Articulated Radial Drilling Attachment. *Machinery* (London), v. 75, July 21, 1949, p. 82.

20A-338. Thread Rolling with Swing-Type Two Roll Knurl Holder. *Screw Machine Engineering*, v. 10, Aug. 1949, p. 23-27.

Relatively simple screw-machine part. Alternate method for producing this part on the screw machine. Details of recommended setups. The success of the method adopted is attributed to the method of rolling the thread. Using two thread rolls, presented to the work in such a manner that pressure is equalized, eliminates the problem of supporting the work.

20A-339. Water Soluble Coolant—A Good Lubricant, Too! Ralph Hause. *Screw Machine Engineering*, v. 10, Aug. 1949, p. 29-30.

A case in which a water soluble coolant was found to be satisfactory for both cutting and lubricating purposes. Despite apparent success, use of this coolant as a lubricant entailed additional maintenance costs on machines. Added maintenance expense is more than offset by the savings realized in oil costs.

20A-340. New Cone Automatic Machine Tool Developments. *Screw Machine Engineering*, v. 10, Aug. 1949, p. 31-35.

Details of construction of new S1, 1-in., 6-spindle "Conomatic" machine.

20A-341. Locating and Chucking Methods Solve Concentricity Problem. *Screw Machine Engineering*, v. 10, Aug. 1949, p. 38-41.

Set-ups for production of piece in which concentricity between two bored surfaces inside the bole end is required to be within ±0.005-in. to the 0.6245-in. reamed hole. On this part, the gaging points are 9 in. apart and the amount of eccentricity multiplies greatly as distance between the two surfaces increases.

20A-342. Business Machines Produced by Modern Methods. W. C. Pfeiffer. *Machinery*, v. 55, Aug. 1949, p. 139-146.

A variety of machine-shop and press operations in production of miscellaneous small parts for bookkeeping, accounting, calculating, and statistical machines.

20A-343. How to Estimate Costs of Shaper Jobs. Herbert W. Brown. *Machinery*, v. 55, Aug. 1949, p. 152-156.

Second in a series of articles on estimating machining costs in the job shop.

20A-344. Instruction Chart Simplifies Grinding of Milling Cutters. Hans A. Branders. *Machinery*, v. 55, Aug. 1949, p. 164.

Purpose of charts is to reduce the expense of grinding and sharpening carbide-tipped milling cutters and also to make possible use of unskilled labor for this work.

20A-345. Tool Engineering Ideas. *Machinery*, v. 55, Aug. 1949, p. 171-173.

"Simple Fixtures that Facilitate Crankshaft Inspection", H. C. Urbauer; "Modified Product Design Permits Simplified Grinding Set-Up", F. H. Mayoh; "Internal Spot-Facing Tool with Convenient Cutter Adjustment", H. Moore.

20A-346. Ideas From Readers. *Modern Machine Shop*, v. 22, Aug. 1949, p. 166, 168-170, 172-173.

"Fixture for Chucking Threaded Workpieces", John F. Nelson; "An Inexpensive Tapping Fixture", Robert Mawson; "Modified Reamer for Machining Steel Ram Rods", E. R. Yarham; and "V-Notches Improve Tin Snips", A. H. Waychoff.

20A-347. Product Design and Its Relation to Milling Cutter and Machine Selection. Mario Martellotti. *Tool Engineer*, v. 23, Aug. 1949, p. 17-20.

Characteristic features of avail-

able milling machines of standard design, and operating characteristics of milling cutters in terms of their metal-removal ability. Factors which influence fixture design and its cost.

20A-348. Current Trends in Cutting Fluids. James McElgin. *Tool Engineer,* v. 23, Aug. 1949, p. 23-24.

History and development. Development and use of bases soluble in both water and oil.

20A-349. Gadgets. *Tool Engineer,* v. 23, Aug. 1949, p. 44-45.

"Rubber Protects Finish", Roger Isetts; "Limit Switches Protect Planer Crossrail Lifting Mechanism", Geo. W. Brown; "Work Holding Methods", Federico Strasser; "Ejector for Punch Press", A. C. Good; "Salvaging Carbide Inserts", Stanley R. Welling; "Ratchet Wrench for Socket Screws", George Hull; and "Adjustable Height Block", J. P. Paquin.

20A-350. Direct Contour Milling. *Aircraft Production,* v. 11, Aug. 1949, p. 264-266.

Design and capabilities of the Kearney and Trecker Milwaukee 2D rotary-head milling machine.

20A-351. Developments in Gear Production. Investigation of Hob-Cutting and Worm-Grinding Processes, Crossed-Axis Shaving. H. Pearson. *Aircraft Production,* v. 11, Aug. 1949, p. 267-271.

Presents results of experimental investigation. Many of the developments described have been introduced into production departments, with resulting savings and improved quality of work.

20A-352. Some Ordinary and Some Unusual Broaching Operations. William F. Schleicher. *Machine and Tool Blue Book,* v. 45, Aug. 1949, p. 84-86, 88, 90, 92.

Some of the work of the Illinois Broach and Machine Co., including both ordinary and unusual operations.

20A-353. Fast, Economical Jig Grinding Possible With New Attachment. J. L. McLaughlin. *Machine and Tool Blue Book,* v. 45, Aug. 1949, p. 95-96, 101-102, 104.

Holes can be located and ground in an average of 15 min. rather than 2-3 hrs. Correction for size and location of holes in hardened components is now possible.

20A-354. Cutting Speeds. *Production Engineering & Management,* v. 24, Aug. 1949, p. 67.

Suggested cutting speed ranges for five cutting-tool metals operating on a variety of ferrous and nonferrous metals and alloys.

20A-355. Tooth Finishing With Modified Gear Shaper Cutters. Guy Hubbard. *Steel,* v. 125, Aug. 1, 1949, p. 80, 106.

Helicoidal-type cutting teeth, set at an angle to the work, which remove metal in the form of fine chips and produce either spur or helical gears with a high degree of accuracy.

20A-356. Gear Finisher Employs New Principle. *Iron Age,* v. 164, Aug. 4, 1949, p. 89.

New development in finishing spur and helical gears. Cutters, set at an angle relative to the work, have teeth of helicoidal shape and are sharpened by face grinding. An advantage is ability to cut freely with no burnishing effect on the work. Both sides of the gear teeth are finished on one traverse.

20A-357. How Do Speed and Feed Affect Tool Life? Thomas Badger. *American Machinist,* v. 93, Aug. 11, 1949, p. 89-92.

Speed-feed charts for determining the most effective cutting conditions for cast-alloy lathe tools plus detailed explanation of their use.

20A-358. Crossbreed Machine Tools May Solve Jet Jobs. E. J. Tangerman. *American Machinist,* v. 93, Aug. 11, 1949, p. 96-97.

Problems of machining the pine-tree form on aircraft gas-turbine blades and wheels, and of precision drilling and turning concentric rings. Use of inserted-tooth broach. Teeth may be ground and backed off to any desired shape or rake, and require a spacing of ¾ in. or more, allowing plenty of chip clearance.

20A-359. More On Files. D. L. Leslie. *American Machinist,* v. 93, Aug. 11, 1949, p. 113.

Comments critically on "How to Choose and Use Files", by Grant Loader. (May 5 issue.)

20A-360. How to Choose and Use Portable Tools. Part 7. Air Power Distribution. H. P. Bailey. *American Machinist,* v. 93, Aug. 11, 1949, p. 114-117.

Troubles due to the compressed-air system, and their remedies.

20A-361. Meter Miniatures From Model Tooling. Harry C. Baldwin. *American Machinist,* v. 93, Aug. 11, 1949, p. 122-123.

Bench-lathe production of small meter parts by Sangamo Electric Co. In addition to economical motion expenditures, such extra touches as unusual carbide tooling, tandem mounting of power and control cylinders, and air gaging have made precision production both more speedy and more accurate.

20A-362. Practical Ideas. *American Machinist,* v. 93, Aug. 11, 1949, p. 124-128.

Describes the following: Timber Templet Guides Feedscrew for Large Taper-Turning Job (Michael P. Blake); Locknut and Collar Adapt Gage for Hidden Bore (Charles Schwartz); Combination-Square Device Locates Tools on Automatics (Donald E. Wood); Hollow Mill for Special Job Made from Acorn Die (Otto V. Howe); Three Inspection Tools Are Samples of Inexpensive Gages (R. H. Fry); Machine-Table Vise Can Align Parts in Any Position (Allan B. Nixon); Depth Measurement with Balls Checks Conical Hole (Ray Cafiero); Double-Pin Gage Center Shafts (W. A. Maring); Quick-Clutching Attachment Speeds Lathe Tapping (Lowell F. Stull); V-Block with Slanted Cut Indexes Work at Common Angles (S. Framurz); Tack-Welding Method Aligns Shaft for Right-Angle Keyways (A. A. Sinisi); and other miscellaneous shop hints.

20A-363. Contour Grinding with Crush-Dressed Wheels. J. C. Wilson and Frederick G. Krafft. *American Machinist,* v. 93, Aug. 11, 1949, p. 139, 141.

Recommendations. Rate of crushing-roll wear for different materials and selection of wheels for crush dressing.

20A-364. Chip Breakers for Carbide Tools. *American Machinist,* v. 93, Aug. 11, 1949, p. 143. From "Tool Manual", published by Carboloy Co.

20B—Ferrous

20B-110. The Manufacture of the Dynaflow Transmission. Fred C. Pyper and A. G. MacDougall. *SAE Quarterly Transactions,* v. 3, July 1949, p. 461-472.

A few of the machine operations that are required in the manufacture of the components of the above. To meet the requirements for accuracy at a sufficiently high volume to reach the projected schedule, it was necessary to purchase 493 new machines, and to relocate, retool, and, in some cases, rework 180 machines. In addition, a large amount of foundry equipment, forge and sheet metal presses, and automatic screw machines were retooled.

20B-111. Broaching "Christmas-Tree" Forms in Turbine Wheels. *Tool Engineer,* v. 23, July 1949, p. 33.

53 "Christmas-tree" shaped slots are broached in the periphery of an 11¾-in. diam., Type 316, stainless-steel turbine wheel.

20B-112. Machining Landing-Gear Parts for Huge Modern Bombers. R. E. Greenough. *Machinery,* v. 55, July 1949, p. 200-204.

Close tolerances, smooth surface finish, maximum strength, and a high degree of uniformity are required.

20B-113. A Pictorial Study of Gears. *Western Machinery and Steel World,* v. 40, July 1949, p. 92-93.

Some of the machine tools used and gears produced.

20B-114. The Manufacture of Split Roller Bearings. Michael S. Johns. *Machinery Lloyd* (Overseas Edition), v. 21, July 2, 1949, p. 106-107, 109, 111-112.

Machine-shop procedures of a British firm.

20B-115. Machining Stainless Steels. Lester F. Spencer. *Iron Age,* v. 164, July 7, 1949, p. 83-89; July 28, 1949, p. 64-68.

Previously abstracted from *Steel Processing,* items 20B-15 and 20B-32, 1949.

20B-116. Machining Cylinder Blocks for the Land-Rover. *Machinery* (London), v. 75, July 7, 1949, p. 3-9.

Equipment and procedures for production of British all-purpose agricultural vehicle.

20B-117. Fast Machining of Brake Bands. *Iron Age,* v. 164, July 14, 1949, p. 106.

Production for Buick from solid rings 1¾ in. wide, $\frac{9}{16}$ in. thick, and 7 in. diam.

20B-118. Huge Marine Bull Gears Machined to Close Tolerances. *Steel,* v. 125, July 18, 1949, p.121.

Although the gears are 146 in. in diam., tolerances are held to 0.0003 in.

20B-119. Hot Spot Machining at Work Temperatures of 500, 1000 and 1500° F. Sam Tour and L. S. Fletcher. *Iron Age,* v. 164, July 21, 1949, p. 78-89.

Results of investigations of the above indicate a technique of substantial significance for increasing metal removal rates. By localized heating of the workpiece just ahead of the point of machining, machinability of metals is radically increased, power consumption is reduced, tool life is improved, and part finish is excellent. Details of turning carbon and alloy steels and high-Co high-Cr refractory alloys.

20B-120. Machining Diesel Engine Fuel Pump Parts. John Linn. *Iron Age,* v. 164, July 28, 1949, p. 44-47.

Outstanding machining and grinding operations for pump components emphasizing close tolerances and gaging methods.

20B-121. Choose Your Steel for Better Machinability. *American Machinist,* v. 93, July 28, 1949, p. 97-98. From paper by M. Eugene Merchant and Norman Zlatin.

Surveys principles of selection and basic reasons for free-machining properties. (See abstract of *American Society for Metals,* Preprint 21, 1948, 20b-72, 1948.)

20B-122. Valve Guide Bushings by Simplified Method. *Automotive Industries,* v. 101, Aug. 1, 1949, p. 41, 60.

Unique method. The practice is to start with cast-iron rods of proper length, rough centerless ground,

then finish all over in a six-spindle automatic.

20B-123. Automatic Balance Milling of Connecting Rods. *Automotive Industries*, v. 101, Aug. 1, 1949, p. 46.

Equipment used by Reo in production of its six-cylinder, valve-in-head, Gold Comet engine.

20B-124. Basic Principles of Efficient Machining of Austenitic Heat-Resistant Steel, Type EI69. (In Russian.) N. N. Zorev. *Kotloturbostroenie* (Boiler and Turbine Manufacture), Jan.-Feb. 1949, p. 24-31.

Causes of low machinability of austenitic Cr-Ni steel (composition given). Optimum conditions for machining.

20B-125. Producing Wright Piston and Jet Engines With High-Production Equipment. *Machinery*, v. 55, July 1949, p. 176-181.

Machining operations. (To be concluded.)

20B-126. The "Finroc" Gear Shaving Process. *Engineer*, v. 188, July 15, 1949, p. 77-79.

New process and equipment developed. The "Finroc" system is claimed to be the only process which succeeds completely in removing the undulations formed on the teeth of helical gears cut on the hobbing machine. The claim is also made that the system results in a greater degree of correction as regards errors in profile, pitch, helix angle, and surface finish.

20B-127. Speeds and Feeds for Machining Stainless-Steel Bars. *Machinery*, v. 55, Aug. 1949, p. 221.

Various types of alloy and various operations.

20B-128. Principles of Contour Turning and Boring as Applied in the Machining of Tool Joints and Drill Pipe. Cecil Clark. *Tool Engineer*, v. 23, Aug. 1949, p. 36-37.

Equipment and procedures. Salient features.

20B-129. Percival Prince. Part II. Pre-Assembled Skin-Panels; Fuselage Fixtures and Assembly; Wing Structure and Assembly; Wooden Fixtures. S. C. Poulsen. *Aircraft Production*, v. 11, Aug. 1949, p. 254-261.

Concluding installment on production methods. Methods and tooling for assembling the fuselage, and wing construction, tooling, and assembly procedure for the wings.

20B-130. Costs Cut with Modern Tooling at Cleco's New Texas Plant. C. H. Elliott. *Production Engineering & Management*, v. 24, Aug. 1949, p. 61-65.

Recent developments in machine tools are establishing higher standards of efficiency for the production of pneumatic tools.

20C—Nonferrous

20C-16. Making and Inspecting Bronze Aircraft-Engine Parts. A. P. McGinnes, Jr. *Machinery*, v. 55, July 1949, p. 182-187.

Especial care is taken in machining to insure dimensional accuracy, and casting methods are closely controlled to obtain a high degree of wear resistance. The alloy used contains 87% Cu, 11% Sn, and 2% Zn.

20C-17. Machining High Nickel Alloys. Gilbert P. Muir. *Tool Engineer*, v. 23, Aug. 1949. p. 38-41.

Modifications of machining and tool design due to differences in properties of Ni alloys from those of low-alloy steels. Tool material, cutting fluid and machining data. Tool-design diagrams.

20D—Light Metals

20D-15. Thin-Wing Construction. The Trend to Integral Structures; Machining Thick Skin Panels for the North American F-86 Fighter. *Aircraft Production*, v. 11, July 1949, p. 227-228.

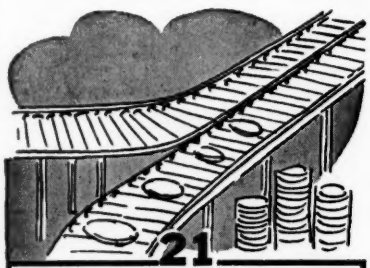
20D-16. Spindling; Some Metal and Wood-Machining Operations. *Aircraft Production*, v. 11, Aug. 1949, p. 280-282.

Spindling, like its near relative routing, is a woodworking process that has been found equally applicable to the machining of the light-alloys of Al and Mg.

20D-17. Taper-Milling of Aircraft Wing Skins. A. C. Slatter and J. J. Sloan. *Machinery*, v. 55, Aug. 1949, p. 158-161.

Method for economically machining tapered Al-alloy wing and fuselage skins in a variety of shapes.

For additional annotations indexed in other sections, see: 19A-175; 21A-38; 21C-4; 23C-50



21 MISCELLANEOUS FABRICATION

21A—General

21A-38. Sheet-Metal Components for Turbo-Jet Engines Require Exact Manufacturing Methods. George H. DeGroat. *Machinery*, v. 55, July 1949, p. 152-159.

Miscellaneous fabrication operations. Forming and other press operations, annealing, welding, and machining. Stainless and low-carbon steel and Nimonic 75 (78% Ni, 20% Cr) are mainly used.

21A-39. Building the Fairchild "Packet" by Advanced Tooling Methods. Arthur D. Jairett. *Machinery*, v. 55, July 1949, p. 168-175.

Various progressive tooling methods, including plastic tooling, universal jogging dies, milling of forgings after assembly, and unique assembly fixtures.

21A-40. Percival Prince. Part I. Basic Production Equipment; Stretch Forming; Soft-Metal Blanking-Tools; Fuselage Construction. S. C. Poulsen. *Aircraft Production*, v. 11, July 1949, p. 218-223.

Operations and equipment applied to a British light passenger aircraft.

21A-41. Metal Working Vital To Production of New Electric Room Heater. Walter Rudolph. *Modern Industrial Press*, v. 11, July 1949, p. 36, 38, 40, 42.

Miscellaneous fabrication and assembly operations. Press operations, welding, machining, as well as an unusual operation consisting of flanging spiral, Ni-Cr ribbons.

21A-42. Planning Production Tooling for Different Product Quantities. John S. Mason. *Production Engineering & Management*, v. 24, Aug. 1949, p. 45-49.

Importance of such factors as "total quantity" and "production rate" when planning tooling for products which are in the development stage.

21A-43. Conveyorized Production of Fractional H. P. Motors. *Production Engineering & Management*, v. 24, Aug. 1949, p. 53-60.

Mechanized handling has greatly increased over-all operating efficiency.

21A-44. Modern Equipment at Work. *Modern Machine Shop*, v. 22, Aug. 1949, p. 146, 148, 150, 152, 154, 156, 158, 160, 162, 164.

Profiling Attachment for a Car-Wheel Lathe; Alvey-Ferguson Rack Washer Assures Clean Racks for Finished Gears; Large Roll Salvaged by Welding with Bronzochrom 185FC; Multipress Used for Three Different Production Jobs; and Broaching Bores in Forged Steel Steering Knuckles.

21B—Ferrous

21B-42. Pressure Vessels. A. C. Vivian. *Institute of Petroleum Review*, v. 3, June 1949, p. 161-166.

Methods of manufacture of steel vessels subjected to internal pressure in use in refinery equipment, vessels used in oilfields production, and high-pressure pipelines. Construction codes and test methods.

21B-43. Texlite Opens New Plant. *Better Enameling*, v. 20, July 1949, p. 8-15.

For manufacture of porcelain-enameled metal signs. Equipment and procedures.

21B-44. Freight Cars From California. Ralph G. Paul. *Western Machinery and Steel World*, v. 40, July 1949, p. 68-71.

Basic steps in the fabrication of underframes for refrigerator cars. Riveting, welding, forming, and assembly are the principal operations.

21B-45. The Manufacture of Tubular Furniture. *Plating*, v. 36, Aug. 1949, p. 803-809.

Procedures.

21B-46. Building the Power-Actuated Cab for White's New 3000 Series Trucks. Joseph Geschelin. *Automotive Industries*, v. 101, Aug. 1, 1949, p. 24-26.

Welding, assembly, and finishing operations.

21B-47. Precise Dimensional Control Necessary in Manufacture of Parts for Crown Cork. Gerald Eldridge Stedman. *Machine and Tool Blue Book*, v. 45, Aug. 1949, p. 65-68, 70-72, 74, 76, 78, 80.

Automatic and special machinery needed to hold volume production and close dimensional accuracy in the manufacture of crown corks. Rolling mills, vertical annealing ovens, presses, and conveyers combine to produce a highly integrated production flow. Plating and decorating procedures.

21B-48. Six Production Operations Eliminated. *Production Engineering & Management*, v. 24, Aug. 1949, p. 49.

Accomplished by substitution of stainless-steel tubing for sheet in fabrication of "gooseneck" parts for water coolers.

21B-49. Elimination of Manual Handling; The Story of Automation at Ford. *Production Engineering & Management*, v. 24, Aug. 1949, p. 51-52.

Automation is defined as the loading, processing in machine, unloading and transfer to the next operation without resorting to manual handling. Operations consist mainly of processing 4.5-in. O. D. by ⅛-in. wall tubing into rear-axle housings.

21B-50. Scale Ball Bearing Assemblies Require Delicate Processing and Handling. O. S. Carliss. *Steel*, v. 125, Aug. 1, 1949, p. 78-79.

Fabrication procedure. Bearings are not touched but are cleaned, lubricated, tested, and assembled in a completely dustless room on stainless-steel benches located in glass booths.

21C—Nonferrous

21C-4. Sheet and Strip Production. *Metal Industry,* v. 75, July 8, 1949, p. 23-26; July 15, 1949, p. 48-49.

Rolling mills, foundry, annealing, pickling and cleaning, shearing, inspection, machining, and handling at British plant. Production consists of a variety of nonferrous metals and alloys.

21D—Light Metals

21D-10. Canadair Production; An Outline of the Plant and Manufacturing Organization. *Aircraft Production,* v. 11, July 1949, p. 229-233.

With emphasis on forming operations.

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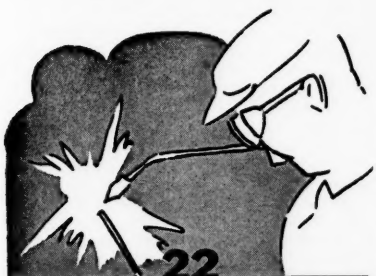


22A—General

22A-158. Regulation of Welding Current by Three-Phase Saturable Choke Coils. (In Russian.) N. S. Siunov. *Avtogennoe Delo* (Welding), Mar. 1949, p. 4-6.

May also be used for other purposes. Operating characteristics.

22A-159. The Welding, Brazing and Soldering of Coated Metals. E. V. Beatson. *Steel Processing,* v. 35, June 1949, p. 296-300. A condensation.

Previously abstracted from *Journal of the Electrodepositors' Technical Society,* item 22A-50, 1949.

22A-160. Seam Welding and Miscellaneous Resistance Welding Processes. E. J. Del Vecchio. *Tool Engineer,* v. 23, July 1949, p. 26-27, 31.

Includes section on testing.

22A-161. New Brazing Method for Joining Nonmetallic Materials to Metals. C. S. Pearsall. *Materials & Methods,* v. 30, July 1949, p. 61-62.

One-step brazing process by which ceramics, carbides, and other nonmetallics can be joined to each other or to metals giving a strong lasting bond. This is accomplished by use of certain metal hydrides or special brazing alloys.

22A-162. Strengths of Various Adhesive-Adherend Combinations. *Materials & Methods,* v. 30, July 1949, p. 83, 85. Based on "Comparative Strengths of Some Adhesive-Adherend Systems," N. J. DeLollis, Nancy Rucker, and J. E. Wier, *National Advisory Committee for Aeronautics,* Technical Note No. 1863, Mar. 1949.

Previously abstracted, item 22A-91, 1949.

22A-163. The Future of Welding and the A.W.S. O. B. J. Fraser. *Welding Journal,* v. 28, July 1949, p. 623-628.

A bright future is predicted for welding and the Society.

22A-164. Arc Welding Safely. W. W. Reddie. *Welding Journal,* v. 28, July 1949, p. 645-650.

Safe practices in construction and installation of equipment and in the execution of the work.

22A-165. Variable Speed Rotary Fixture. H. A. Hupp, Jr. *Welding Journal,* v. 28, July 1949, p. 670-672.

Fixture which acts as a mount for the part and also provides rotary movement around a vertical axis. Welding and brazing of parts is often facilitated by use of such fixtures.

22A-166. Tooling-up for Temperamental Materials. *Modern Industry,* v. 18, July 15, 1949, p. 97-99.

Adapting standard equipment for spot welding stainless steel. In addition, the company has developed a "poke-welder" for tack-welding stainless steel. For gas welding, a new group of fluxes helps reduce oxidation of parts and improve weld quality.

22A-167. Induction Brazing With Silver Alloys Offers Many Advantages and Economies in Fabricating Metal Assemblies. Frank W. Curtis. *Steel,* v. 125, July 18, 1949, p. 82-84, 124-126.

Alloy compositions; relative strengths of joints in relation to their thickness; joint design; and production procedures, equipment, and layout. Speed with which joining temperatures can be obtained, uniformity of heat generation, and economy in heating costs are some of the benefits claimed.

22A-168. Les flux gazeaux dans le soudage, le soudobrasage et le brasage des métaux et alliages. (Gaseous Fluxes in Welding, Weld-Brazing, and Brazing of Metals and Alloys.) B. Liebesman. *Soudure et Techniques Connexes,* v. 3, Mar.-Apr. 1949, p. 75-80.

Proposes use of liquid fluxes, which will be converted into the gaseous state upon heating for welding and brazing. Advantages of the use of such fluxes as compared with solid ones. Methods and apparatus. Results for different metals.

22A-169. Comparison of Radiation from Argon Arc with That of Ordinary A. C. Welding. E. Van Someren and E. C. Rollason. *Transactions of the Institute of Welding,* v. 12, June 1949, p. 52.

Results of measurements.

22A-170. Properties of Some Oil Resistant Adhesives. Gordon F. Lindner, A. F. Schmelzle and Fred Wehmer. *Rubber Age,* v. 65, July 1949, p. 424-426.

Report is confined to adhesives made from Neoprene, Buna N, and Thiokol. Stresses the type of adhesive which gains its strength due to a loss of solvent rather than those which require curing. Variation in adhesion to steel and aluminum with rubber-resin content; shear-test results for various adhesives bonding plasticized polyvinyl chloride; adhesion of three vinyl compounds to aluminum; adhesion to plasticized vinyl sheeting; and comparison of resistance of three adhesives to "813" fuel.

22A-171. Three-Phase, Direct-Energy, Resistance-Welding Equipment. J. H. Cooper. *Welding Journal,* v. 28, Aug. 1949, p. 741-748.

Advantages of dry-disk rectifier or d. c. welders as judged by welder power and welding-current characteristics are said to predominate over the advantages of low-frequency welders.

22A-172. Designing for Welding. Part VIII. Seam Welding. Wallace A. Stanley. *Welding Journal,* v. 28, Aug. 1949, p. 773-774.

22A-173. Welded Airplane. *Welding Engineer,* v. 34, Aug. 1949, p. 25-27.

Welding processes on the 1949 Ryan Navion airplane. Spot, inert-arc, metal-arc, and gas welding; and furnace and induction brazing.

22A-174. Small Pipe Pressure Welded. William C. Henzlik. *Welding Engineer,* v. 34, Aug. 1949, p. 28-29.

Process applied to 1¼-in. wrought-iron pipes for radiant-heating coils.

22A-175. Balanced Waves for Inert Arc Welding. R. F. Wyer. **Part II.** *Welding Engineer,* v. 34, Aug. 1949, p. 30-33.

Contrasts the balanced-wave welder with the radio-frequency-stabilized circuit. Examples of applications of inert-arc welding to Al, Mg, stainless steel, and Cu.

22A-176. Check Your Welding Circuits To Save Money, Get Better Welds and Increase Operator Comfort, Safety and Efficiency. R. L. Townsend. *Industry and Welding,* v. 22, Aug. 1949, p. 30-32, 34.

Recommendations.

22A-177. Arc-Metal-Transfer Analyzer. R. C. McMaster. *Electrical Engineering,* v. 68, Aug. 1949, p. 679-680. A condensation.

A sensitive relay instrument for analyzing welding-arc short circuits caused by metal-transfer. It is a rugged and practical piece of equipment involving no electronic tubes or delicate components. Internal means are provided for calibrating the operating voltages and timing the duration of short circuits. It has been used in extensive studies of welding arcs with different electrode core wires and coating constituents; and appears to be of special value in studying the influence of electrode coatings, constituents, and conditions upon metal transfer during welding.

22A-178. Electrical Advantages of Low-Frequency Welding Converters. C. B. Stadum. *Electrical Engineering,* v. 68, Aug. 1949, p. 680. A condensation.

22A-179. Welding Processes—Uses and Equipment. *Materials & Methods,* v. 30, Aug. 1949, p. 77, 79.

22A-180. Causes and Cures of Some Common Welding Problems. *Tool Engineer,* v. 23, Aug. 1949, p. 47-48.

22A-181. Unusual Attachment Expands Uses of Riveters. *Steel,* v. 125, Aug. 1, 1949, p. 88.

Standard riveters have been converted to drill, countersink and riveting machines in a few hours. Conversion procedure.

22A-182. (Book) **The Headland Welding.** 226 pages. Thos. P. Headland Ltd., 141-142 Lower Marsh, London S.E.1, England. 12s. 6d. net.

Data book consisting of an index and price list, a series of illustrations, and guide charts for the different welding processes. A comprehensive list of all items required for welding and flame cutting. The charts contain the fullest information relating to the gas, arc, and resistance welding of a very large number of different kinds of steels and certain nonferrous metals.

22A-183. (Book) **Glass-To-Metal Seals.** J. H. Partridge. 238 pages. 1949. Society of Glass Technology, "Elmfield", Northumberland Road, Sheffield 10, England.

All aspects of sealing glasses and metals and the sealing of ceramic materials to metals. Sealing of different glasses to one another and to ceramic materials. Problems of stress in seals and variation of stresses when the devices embodying them are in service.

22B—Ferrous

22B-256. Investigation of the Electrical Properties of Argon-Shielded Welding Arcs. (In Russian.) A. Ya. Brodskii and G. M. Tikhodeev. *Avtogennoe Delo* (Welding), Mar. 1949, p. 1-3.

The arcs produced between tungsten and Cr-Ni steel were investigated. Influence of additions to the argon on arc voltage was established, as well as other factors.

22B-257. Type MEZ-04 Electrodes for Welding Low-Carbon Steels. (In Russian.) N. N. Kryukovskii. *Avtogennoe Delo* (Welding), Mar. 1949, p. 9-11.

Chemical composition of above electrodes and their coatings and mechanical properties of the welds.

22B-258. The Welding of High-Pressure Air-Vessel Assemblies; Metallurgical and Mechanical Considerations. K. G. Lewis, *Metallurgia*, v. 40, June 1949, p. 77-87.

Materials and methods of assembly, with special reference to the austenitic welding of low-alloy steels. The pulsation form of pressure test and results for a series of air-vessel assemblies. It is concluded that low-alloy-steel vessel bodies are satisfactorily sealed by austenitic welding, the resultant unit being definitely superior to a screwed and sweated assembly. 25 ref.

22B-259. Production of the Land-Rover. *Machinery* (London), v. 74, June 30, 1949, p. 871-879.

Production of British multi-purpose vehicle developed to meet the demands of agriculture and industry. Emphasizes welding and assembly operations.

22B-260. Arc Welding in Sweden. K. A. Ringdahl and L. A. Lidstone. *Welding*, v. 17, July 1949, p. 278-289.

Said to be the first authoritative account to be published in Britain of arc welding in Sweden.

22B-261. Welded Factory for Wool Industry. *Welding*, v. 17, July 1949, p. 290-293.

Unusual steel-framework design for British mill.

22B-262. Motor Car Production. 5. Arc Welding on the Chassis of the "Vanguard". J. W. Slack. *Welding*, v. 17, July 1949, p. 294-299.

As applied to British automobile.

22B-263. Fabrication at B.T.H. T. Holme and H. H. Reeve. *Welding*, v. 17, July 1949, p. 300-308.

Third part of a survey dealing with activities of above factory at Rugby, England, deals with methods for testing welded products, control of welders, and maintenance work. Products consist largely of heavy steel equipment.

22B-264. Cam Life Increased 1200%. *Welding Journal*, v. 28, July 1949, p. 672.

How Al-bronze welding rod was used to repair a cold nut blanker.

22B-265. Make Tough Jobs Easy. H. B. Gilson. *Welding Journal*, v. 28, July 1949, p. 673-674.

Three key steps for producing strong bronze welds in repair work.

22B-266. New Technique for Welding Chrome Pipe Disclosed. *Welding Journal*, v. 28, July 1949, p. 674.

According to the new method for 4-6 Cr-steel pipe a large preheating tip with oxy-acetylene is used first to bring the temperature of the joint up to 600-800° and keep it there while being welded with a chromium electrode (A.S.T.M.-A.W.S. Spec. No. E-502). After this, the temperature is raised to 1200-1350° and the joint wrapped with asbestos tape to a minimum thickness of 1 in. and cooled to room temperature. Contrary to popular belief this technique does not make the weld metal brittle. Mechanical tests gave very desirable results.

22B-267. Weldability of Low-Alloy High-Tensile Steel. George G. Luther, Carl E. Hartbower, and Donald B. Roach. *Welding Journal*, v. 28, July 1949, p. 289s-309s.

Effects of Ti and V on the mechanical properties and weldability of an experimental low-alloy high-tensile steel. Small variations in amounts of these elements produced a marked effect on the transition temperature.

22B-268. The Weldability of Carbon-Manganese Steels. R. D. Williams, D. B. Roach, D. C. Martin, and C. B. Voldrich. *Welding Journal*, v. 28, July 1949, p. 311s-325s.

Usefulness of the notched-bead slow-bend test for measuring the weldability of steels and the influence of C and Mn in weldability. Deals with specific points leaving over-all conclusions to the summary report by Voldrich and Harder. (See following abstract.)

22B-269. Review on the Weldability of Carbon-Manganese Steels. C. B. Voldrich and O. E. Harder. *Welding Journal*, v. 28, July 1949, p. 326s-336s.

Reviews 8-yr. program of research. Investigations have evaluated the influence of C and Mn on the weldability of the carbon-manganese steels and the usefulness of a notched-bead bend test for evaluating weldability. Discusses important factors involved under the headings: steel (base metal) factors; welding technique; design; and service-condition.

22B-270. Tubing Produced by Welding Coiled Strip. *Iron Age*, v. 164, July 28, 1949, p. 47.

Method developed consisting of mechanized, inert-gas-shielded arc welding.

22B-271. Welding Saves Press Casting. *Iron Age*, v. 164, July 28, 1949, p. 58.

Repair of a large felt press casting by welding.

22B-272. Protection des surfaces intérieures des appareils de raffinerie. (Protection of Internal Surfaces in Refineries.) H. Mayslich. *Soudure et Techniques Connexes*, v. 3, Mar.-Apr. 1949, p. 52-68.

Modern methods, with particular emphasis on deposition of corrosion-resistant metal on new and used apparatus by means of arc or gas welding. Methods and optimum conditions for such welding. Possibility of protection by means of rubber and other plastic acid-resistant materials.

22B-273. Determination of Microstructure of Stainless-Steel Weld Seams on the Basis of Microhardness. (In Russian.) B. I. Medovar and A. E. Asnis. *Zavodskaya Laboratoriya* (Factory Laboratory), v. 15, May 1949, p. 570-571.

It was found that the presence of carbides increases the tendency of the weld metal toward intercrystalline corrosion and sharply decreases its plasticity. Chromium carbides may be differentiated from the ferrite component by microhardness determination. Therefore, this technique is recommended for more complete characterization of the quality of the weld.

22B-274. Welding as an Aid to Steel Economy. *Transactions of the Institute of Welding*, v. 12, June 1949, p. 47-51.

Proceedings of conference held in Britain, March 22-25, 1949.

22B-275. Survey of the Use of Welding in Structures. W. S. Atkins. *Transactions of the Institute of Welding*, v. 12, June 1949, p. 59-63.

Main advantages over riveted or bolted construction.

22B-276. Survey of the Use of Welding in Structures. S. M. Reisser. *Transactions of the Institute of Welding*, v. 12, June 1949, p. 64-69.

Second of two papers on above subject. Draws a clear distinction between the two main types of welded structures. Main principles of design and detailing, and influence of works equipment and organization on the cost of fabrication and erection.

22B-277. The Economic Construction of Moderate Sized All-Welded Ships. H. H. Hagan. *Welding Research*, v. 3 (bound with *Transactions of the Institute of Welding*, v. 12), June 1949, p. 50r-51r.

Principally with reference to shipyard layout and personnel problems.

22B-278. Welding as Applied to Railways and Rolling Stock. B. R. Byrne. *Welding Research*, v. 3 (bound with *Transactions of the Institute of Welding*, v. 12), June 1949, p. 52r-59r.

A variety of above application, showing savings made possible by substitution of welding for other forms of construction.

22B-279. Welding on British Railways—Trackwork and Structures. N. W. Swinnerton. *Welding Research*, v. 3 (bound with *Transactions of the Institute of Welding*, v. 12), June 1949, p. 60r-66r.

Savings possible by substitution of welding for other methods.

22B-280. Welding as an Aid to the Saving of Steel and Manpower in Railway Workshops. G. Foster. *Welding Research*, v. 3, (bound with *Transactions of the Institute of Welding*, v. 12), June 1949, p. 67r-72r.

22B-281. The Effect of Various Fasteners on the Fatigue Strength of a Structural Joint. K. H. Lenzen. *American Railway Engineering Association Bulletin*, v. 51, June-July 1949, p. 1-28.

Three groups of structural joints, identical except for the fasteners, were subjected to fully reversed cycles of fatigue loading. The selected fasteners were hot-driven rivets, cold-driven rivets, and bolts. A group of static tests and a group of fatigue tests on the typical joints. 10 ref.

22B-282. About One of the Largest Thermit Welding Jobs Ever Performed on the Pacific Coast. *Victor Weld*, July 1949, p. 4-5.

A thermit weld on a fractured freighter skeg.

22B-283. Heavy Cutting in the Steel Mill. L. P. Elly. *Welding Journal*, v. 28, Aug. 1949, p. 721-727.

22B-284. Welding Metallurgy—Iron and Steel. O. H. Henry, G. E. Claussen, and G. E. Linnert. *Welding Journal*, v. 28, July 1949, p. 642-645; Aug. 1949, p. 731-740.

Begins serial publication of revised edition of above book originally published in 1940. July installment consists of the introductions to the first and second editions and Chapter 1, "Metallurgy of Welding". Aug. issue presents Chapter 2: "Types of Steel and Their Manufacture". Various forms of steel-making furnaces and the respective processes, also the properties and applications of different steels.

22B-285. Oxyacetylene Flame Shape Cutting in Railroad Shops. F. B. Rykoskey. *Welding Journal*, v. 28, Aug. 1949, p. 749-755.

22B-286. Should the Guided-Bend Test Be Modified? L. K. Stringham. *Welding Journal*, v. 28, Aug. 1949, p. 755-758.

Previously abstracted from *Industry and Welding*, items 22A-125 and 22B-245, 1949.

22B-287. Rigid-Frame Harbor Shed. G. L. Revell. *Welding Journal*, v. 28, Aug. 1949, p. 759-763.

World's largest unobstructed single-span harbor shed realized full advantages of welded rigid-frame construction. Over-all structure and details of construction.

22B-288. Arc Welding in the Mower Industry. John A. Perry and C. A. McClean. *Welding Journal,* v. 28, Aug. 1949, p. 764-766.

22B-289. Diesel Cylinder Head Repair. J. W. Kenefic and R. E. Barber. *Welding Journal,* v. 28, Aug. 1949, p. 766.
Use of gas welding for repair of cast-iron heads by a large railroad in the Northwest.

22B-290. How to Weld Pipe. F. C. Geibig. *Welding Journal,* v. 28, Aug. 1949, p. 767-772.
Helpful hints for steel pipe.

22B-291. Butt-Welding Structural I-Beams. F. Lang. *Welding Journal,* v. 28, Aug. 1949, p. 774-775.
The importance of proper welding sequence, and a method of estimating contraction.

22B-292. Welding Rails on Ship Model Towing Basin. W. J. Leonard. *Welding Journal,* v. 28, Aug. 1949, p. 365s-372s.
Procedures for welding 165 and 180-lb. rails which avoid undesirable metallurgical changes. Alignment requirements favor the butt joint.

22B-293. Metallurgical Aspects of Welding Mild Steel. Nils Christensen. *Welding Journal,* v. 28, Aug. 1949, p. 373s-380s.
Factors governing the selection of electrode coatings from the fundamental point of view. 24 ref.

22B-294. How Ship Failures Affect You. E. Paul DeGarmo. *Welding Engineer,* v. 34, Aug. 1949, p. 17-20.
The relationship between failures of welded ships and prevention of failures in other welded structures. Residual stresses, preheat vs. postheat, and design.

22B-295. Australian Rail-Welding Process. Herbert Leopold. *Welding Engineer,* v. 34, Aug. 1949, p. 21, 24.
A modified thermit-welding process developed by an Australian inventor.

22B-296. River Crossings for Pipe Lines. Elton Sterrett. *Welding Engineer,* v. 34, Aug. 1949, p. 22-24.
Welding problems. Pipe lines are often divided in three so that damage to one branch will not stop the flow.

22B-297. Shattered Flywheel Restored to Service. Rene D. Wasserman. *Welding Engineer,* v. 34, Aug. 1949, p. 34-35.
New processes of arc cutting and low-heat cast-iron welding which made it possible to repair the two-ton flywheel of a rock crusher.

22B-298. Tanks to Push up Windows. *Welding Engineer,* v. 34, Aug. 1949, p. 36-37.
Seam welding of steel vacuum tanks used in connection with the automatic operation of auto windows.

22B-299. Some Thoughts on Improving Flame Cutting Operations. Part 2. *Machine and Tool Blue Book,* v. 45, Aug. 1949, p. 107-108, 110, 112, 114, 116.
This part, in addition to a discussion of lags and kerfs, includes sections on bevel cuts and circle cuts.

22B-300. Here's How Midwest Welds Pipe and Fittings. Phil R. Becker. *Industry and Welding,* v. 22, Aug. 1949, p. 22-24, 26-27, 29, 69-71.
A modern method of fabricating pipe and fittings for a variety of industrial applications. Preparation, setup, and welding procedures.

22B-301. "Canned" Aircraft Engines—A Welding Pictorial. *Industry and Welding,* v. 22, Aug. 1949, p. 36-39.
Fabrication of two types of pressurized steel shipping containers for storing and shipping airplane engines.

22B-302. Tips on Hardsurfacing. M. Riddihough. *Industry and Welding,* v. 22, Aug. 1949, p. 40, 42-46.
Differences between metallic-arc and oxy-acetylene deposition of hard facing materials. Techniques for fusion welding and braze welding.

22B-303. Welding Makes Lower Cost Shells. *American Machinist,* v. 93, Aug. 11, 1949, p. 120.
Application to 2½-gal., stainless-steel, fire extinguisher.

22B-304. All-Welded Steel Barge Construction. *Engineer,* v. 188, July 22, 1949, p. 101-102.
At a British plant.

22C—Nonferrous

22C-22. Radiator Core Soldering Oven. Fred C. Dietrich. *Industrial Gas,* v. 28, July 1949, p. 13.
Equipment used in the manufacture of tubular radiator cores. Pretinned brass tubes are soldered to copper fins.

22C-23. La soudabilité des métaux nonferreux et les résultats de leur soudage au chalumeau oxy-acétylénique. (Weldability of Nonferrous Metals and Results Obtained by Welding Them With the Oxy-Acetylene Flame), Ed. Henrion. *Revue de la Soudure; Lastijdschrift,* v. 5, No. 1, 1949, p. 16-18.
Experimentally investigated for a series of light-metal alloys (Al-Mg_3, Al-Mg_5, Al-Mg_7), differently heat treated. Results indicate the possibility of perfect welding of materials using the oxy-acetylene flame as the source of local heating.

22C-24. Soldering Does Not Affect Properties of Cold Rolled Copper. Edwin Laird Cady. *Materials & Methods,* v. 30, Aug. 1949, p. 75-76.
Tests indicate truth of above statement.

22D—Light Metals

22D-43. Weld Fabrication of High-Pressure Containers From "AMTs" Aluminum-Alloy Sheet. (In Russian.) D. A. Litvinov and D. A. Kochergin. *Avtogennoe Delo* (Welding), Mar. 1949, p. 6-8.
Optimum conditions, on the basis of experimental investigation of different methods of welding and different electrodes used.

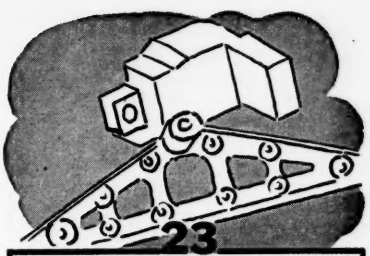
22D-44. La saldobrasatura delle leghe leggere. (Soldering and Brazing of Light Alloys.) *Alluminio,* v. 18, Mar.-Apr. 1949, p. 161-170.
Recommended procedures for the various common alloys of Al, including design of joints.

22D-45. Welding Applied To Aircraft Construction. G. B. Evans. *Transactions of the Institute of Welding,* v. 12, June 1949, p. 70-75.
Suggests that efforts be made to improve the joining of high-strength, heat treatable, light alloys. 35 ref.

22D-46. Welding With the Aircomatic Process. E. H. Roper. *Welding Journal,* v. 28, Aug. 1949, p. 728-730.
Additional data, including detailed information on welding procedures for aluminum.

For additional annotations indexed in other sections, see:
12-163; 14B-80; 19B-148; 21A-38; 24B-35

AVOID DELAY AT THE REGISTRATION DESK
See page 61 for Metal Show Advance Registration Coupon



23 APPLICATIONS

23A—General

23A-21. Materials at Work. *Materials & Methods,* v. 30, July 1949, p. 66-67.
Steel betatron magnet core; stainless-steel orchard heater; brazing aluminum by means of a special-purpose automatic gas-fired machine; rubber vibration dampener; glass fiber-reinforced vaporizer; and rubber-covered steel container for use in handling acids, alkalis and other corrosive solutions.

23A-22. Heat-Resistant Alloys for Aviation. F. S. Boericke. *Aero Digest,* v. 59, Aug. 1949, p. 43-45.
With emphasis on those produced by Haynes Stellite Co.

23A-23. Materials in the Aircraft Industry. Clyde Williams. *Materials & Methods,* v. 30, Aug. 1949, p. 51-54.
Present knowledge of structural materials for aircraft, major gaps in that information being indicated. Possible new materials for aircraft of the future, and finally some factors, other than purely technological ones, which influence the choice of materials.

23A-24. Materials at Work. *Materials & Methods,* v. 30, Aug. 1949, p. 66-68.
High-strength steel trailer, transparent plastic carburetors, plastic shaver housing, aluminum and plastic sander, bonded silicone rubber for high-pressure gasket and diaphragm applications, corrosion-resistant air valve, and all-aluminum inboard runabout.

23B—Ferrous

23B-39. Stainless Steel in Bridge Bearings. Frank M. Masters. *Metal Progress,* v. 56, July 1949, p. 80.
Use of 18-8 stainless, first tried in 1937. These bearings are still in perfect condition.

23B-40. Industrial Use of Modified Armor-Plate Steel. A. F. Busick, Jr. *Welding Journal,* v. 28, July 1949, p. 651-659.
Uses in power excavators used for strip mining of coal. New designs and selection of welding electrodes and procedures.

23B-41. Steel Finds New Market: RBM Building. Thomas A. Dickinson. *Western Metals,* v. 7, July 1949, p. 22-23.
New type of building construction known as "RBM" (Reinforced Brick Masonry). Structural steel reinforcing is incorporated by the bricklayers to produce earthquake-proof structures.

23B-42. Materials for Moulds. Part I. L. Sanderson. *British Plastics,* v. 21, July 1949, p. 405-407.
Various steels used for plastics molds, their properties, advantages, and disadvantages.

23B-43. Selection of Steel for Automobile Parts; What Engineers Should Know Today About Hardenability-Band Steels. Part I. Introduction to

Hardenability. Joseph Geschelin. *SAE Journal,* v. 57, Aug. 1949, p. 17.

First of a six-part report issued by the SAE Iron and Steel Technical Committee. Succeeding installments were prepared by A. L. Boegehold.

23B-44. High-Strength Steel Today. E. K. Waldschmidt. *Coal Age,* v. 54, Aug. 1949, p. 95-97.

Use in the manufacture of mining, haulage and transportation equipment.

23C—Nonferrous

23C-46. Silber-Blei-Legierungen als Gleitlagerwerkstoffe. (Silver-Lead Alloys as Bearing Materials.) Ernst Raub. *Zeitschrift fur Metallkunde,* v. 40, May 1949, p. 167-170.

Electrodeposition of Ag-Pb alloys and their special properties; also the production of adhesive, galvanic, Ag-Pb alloy deposits on steel.

23C-47. Titanium, A New Structural Metal. *Journal of the Electrochemical Society,* v. 96, July 1949, p. 19C-21C. From address by E. A. Gee.

Production, properties, and fabrication.

23C-48. How To Keep the Bosses in Line. *Die Castings,* v. 7, Aug. 1949, p. 15, 52.

Postage-stamp vending machine with an Al die-cast frame. Zn die castings form trim and some working parts.

23C-49. Close-Fitting Parts Without Machining. *Die Castings,* v. 7, Aug. 1949, p. 16-18, 53.

Use and design of aluminum and zinc die castings for microscopes.

23C-50. Carbide Feed Rolls for Screw Machine. *Product Engineering,* v. 20, Aug. 1949, p. 103.

23D—Light Metals

23D-74. Applications of Light Metals. *Light Metals,* v. 12, July 1949, p. 388-392.

A bibliography of articles on applications of Al and Mg and their alloys which have appeared in *Light Metals,* June 1946 to May 1949.

23D-75. Great Strength Claimed for Aluminum Roof. *Petroleum Refiner,* v. 28, July 1949, p. 149.

New patented, "self-supporting" Al roof now being manufactured by a British firm and claimed to have the same strength as a similar steel structure. It is intended primarily as a roof for oil or chemical storage tanks.

23D-76. Aluminum Foil Finds New Uses as a Packaging and Insulating Material. Kenneth Rose. *Materials & Methods,* v. 30, July 1949, p. 63-65.

Properties and applications.

23D-77. Magnesium Uses Grow In Textile Equipment Field. H. Nuernberger. *Modern Metals,* v. 5, July 1949, p. 14-16.

Some of the more important magnesium applications in the above field.

23D-78. Two-Cycle Aluminum Diesels. *Modern Metals,* v. 5, July 1949, p. 18.

Al castings are used almost throughout.

23D-79. Orthopedic Braces Now Mass-Produced. *Modern Metals,* v. 5, July 1949, p. 20.

New lightweight orthopedic braces made of Al forgings, tubing, and screw-machine parts.

23D-80. Alcoa's Davenport Office Building. *Modern Metals,* v. 5, July 1949, p. 22.

Building utilizes aluminum wall panels, window frames, wiring, hardware, partition facings, ducts, doors, flashing, fixtures, paint, and acoustical ceiling panels—an estimated million pounds in all. These products are made from extrusions, castings, sheet, tubing, and foil.

23D-81. Ultra-Light Gasoline Engines. *Modern Metals,* v. 5, July 1949, p. 24.

2-hp., twin-cylinder engine consisting largely of Al, and weighs only 23 lbs.

23D-82. An Aluminum House Promotion. *Modern Metals,* v. 5, July 1949, p. 30. Based on article in *Canadian Homes & Gardens,* Apr. 1949.

House consisting largely of aluminum being sold by a Toronto, Canada, department store.

23D-83. Die-Forged Aluminum Wheels for Trailers. *Automotive Industries,* v. 101, Aug. 1, 1949, p. 45, 60.

The A51S-T6 alloy is used for freight trailers. A 50-lb. weight reduction per wheel is achieved.

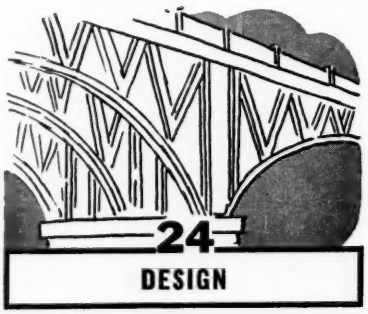
23D-84. Sull'uso clinico dell'alluminio metallico. (Clinical Uses of Metallic Aluminum). A. Cavallazzi. *Alluminio,* v. 18, Mar.-Apr. 1949, p. 158-160.

Results of experiments on the therapeutic value of Al foil and powder for healing different types of wounds.

23D-85. Pressure-Tight Die Castings. *Die Castings,* v. 7, Aug. 1949, p. 19-20, 61-63.

Production of Al die castings for hydraulic-circuit components by boosting die-casting-machine pressures and by adequate overflow vents and careful gating. These castings are made to withstand 1800 psi.

For additional annotations indexed in other sections, see:
3B-157; 24A-107



24A—General

24A-104. How to Design Links and Clevises. *Welding Journal,* v. 28, July 1949, p. 675-677.

Large number of diagrams for welded design.

24A-105. Designing for Welding. Part VII. Wallace A. Stanley. *Welding Journal,* v. 28, July 1949, p. 677-678.

As applied to seam welding.

24A-106. Plastic Bending of Wide Flange Beams. W. A. Andrews. *Welding Journal,* v. 28, July 1949, p. 309s-310s.

The possibilities of utilizing the strength of structural members beyond the elastic range are analyzed mathematically.

24A-107. Car-Body Construction—A Rational Approach. *Light Metals,* v. 12, July 1949, p. 359-361.

Planned joint use of aluminium and steel in Armstrong Siddeley cars (British).

24A-108. Mechanical Fasteners—Their Selection and Use. N. Bruce Bagger. *Materials & Methods,* v. 30, July 1949, p. 71-82.

Six basic categories of permanent and semi-permanent fastening devices, not from the standpoint of installation techniques, but from that of the relative behavior they, and the materials from which they are made, exhibit for fastening applications. Much information concerning selection of materials and designs.

24A-109. Design of Aircraft Structures for "Mass Production". O. A. Wheelon. *SAE Quarterly Transactions,* v. 3, July 1949, p. 480-488; discussion, p. 488-489.

Examination of cost factors and the distribution of costs at various quantities shows the relative importance of each. The principles of design producibility are shown to be directed toward minimizing tooling and manufacturing problems. Material and assembly problems. Selection of metals and alloys and of their fabrication. (See abstract of condensed version from *SAE Journal.*)

24A-110. Contact Stress Concentration. R. Howard. *Machinery* (London), v. 75, July 7, 1949, p. 16-17.

Design of roller bearings, cams, and gear teeth to avoid high contact stress concentrations with their accompanying tendency toward fatigue failure. Tapering toward the ends is the usual design technique used. How this form (known as "crowning") is produced.

24A-111. How To Calculate Blanks for Seamless Rectangular Shells. Sergius D. Brootzkoos. *American Machinist,* v. 93, July 28, 1949, p. 67-71.

Sloping curves for corners of the blanks are usually approximated. A Russian method that is geometrically exact and which avoids folds, tears, or excessive thickening.

24A-112. Pointers for Lower-Cost Designs. *American Machinist,* v. 93, July 28, 1949, p. 121.

Castings, moldings, punchings, formed parts, fabricated parts, machined parts, screw-machine parts, welded parts, treatments and finishes, and assemblies.

24A-113. Formularisation of Stress-Strain Curves; Application to Test Results on Certain Alloys. Doris Crowden. *Metal Treatment and Drop Forging,* v. 16, Summer 1949, p. 121-128, 130.

In a previous issue, the author gave a method for the calculation of physical properties of certain metals, as typified by Mg-base alloys, using a curve of the hyperbola type to represent stress-strain relationships. In this section, use of the parabola and ellipse and advantages which they sometimes possess.

24A-114. Thermal Stresses in Turbine Blades. M. J. Lighthill and F. J. Bradshaw. *Philosophical Magazine,* ser. 7, v. 40, July 1949, p. 770-780.

A theory is developed. Consequences of the theory are that on cooling, maximum stress occurs at all times near the position of maximum thickness, but that on heating, the largest stresses are initially near an edge, though their position moves along the blade towards the position of maximum thickness and their magnitude increases. Maximum stress is inversely proportional to thermal conductivity for the lower heat-transfer rates, but is less sensitive to it at higher rates. Application to sintered alumina and comparison with experiment.

24A-115. Effect of Fit and Truncation on the Strength of Whitworth Threads. C. W. Smith and A. C. Low. *Engineering,* v. 168, July 22, 1949, p. 93-95.

Previously abstracted from *Machinery* (London), item 24A-100, 1949.

24A-116. Honeycomb-Sandwich Structures. I. H. C. Engel and T. P. Pajak.

Product Engineering, v. 20, Aug. 1949, p. 81-85.

Describes properties and applications of various designs and material types of the above. Mechanical properties of the panels. Core material may be resinous, fabric, paper, or metal foil. Sheet metal, or plywood, cotton, or glass fabric laminates may be used as face materials. Necessary adhesive properties. (To be concluded.)

24A-117. The Function of Interchangeability in Tool Engineering. G. H. Stimson. *Tool Engineer*, v. 23, Aug. 1949, p. 29-31.

Interchangeability of components —the basis of mass production which depends upon application of tolerances to dimensions and accurate control of dimensions within tolerance during production.

24A-118. Design of Broaching Fixtures. John A. Markstrum. *Tool Engineer*, v. 23, Aug. 1949, p. 32-35.

Requirements and qualities desired. Design problems encountered.

24A-119. (Book) **Strength of Materials. Ed. 1.** J. P. Den Hartog. 323 pages. 1949. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y.

Designed for use in a first course for engineering students. Each chapter starts with general theory; then presents practical examples. Includes problems, complete with answers, at the end of the text. Tension, torsion, bending, compound stresses, deflections of beams, cylinders and curved bars, the energy method, buckling, and experimental elasticity.

24B—Ferrous

24B-35. Welded Steel Structures. Arsham Amirikian. *Welding Journal*, v. 28, July 1949, p. 629-639.

Past and present practice and future trends in design; the part played by research; fabrication practice; prefabrication; and examples of modern framing.

24B-36. For Steel Tanks and Pressure Vessels—Minimum Thickness of Cylindrical Vessels. R. R. Maccary and R. F. Fey. *Petroleum Refiner*, v. 28, July 1949, p. 136-138.

Thicknesses obtained for many low-pressure applications by use of stress equations are considered too thin not only from a manufacturing standpoint, but also on the basis of inherent rigidity and stability.

24B-37. The Pressure Vessel Research Committee, 1946-49. *Welding Journal*, v. 28, July 1949, p. 380s-384s.

Presents brief report of the work of the materials, design, fabrication, inspection and testing, and increased-design-stresses divisions. Details of work of design division at Purdue. Bibliography of reports issued by the committee during the above period.

24B-38. (Book) **Aluminum Structural Design.** Paul E. Brandt. 124 pages. Reynolds Metals Co., 2500 S. Third St., Louisville 1, Ky. No charge.

Includes chapters on figuring tensile stresses, compressive stresses, bending stresses, and shear stresses, as well as stresses in cylinders subjected to fluid pressure. Fabricating considerations and joining methods, including riveting, bolting, fusion welding, and spot welding. Additional chapters cover deflection and vibration problems.

24C—Nonferrous

24C-12. Economical Die Castings. James L. Erickson. *Product Engineering*, v. 20, Aug. 1949, p. 104-108.

How to design die-cast parts that can be produced by a short casting cycle and with simplified tooling.

24C-13. Die Casting Die Design. Part IV. Sprue, Runners, Feeds, Gate, Overflows and Vents. H. K. Barton and James L. Erickson. *Tool & Die Journal*, v. 15, Aug. 1949, p. 45-48.

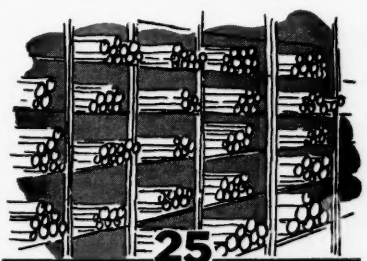
(To be continued.)

24D—Light Metals

24D-13. Light-Alloy Pistons. (Concluded.) *Light Metals*, v. 12, July 1949, p. 393-395.

Summarizes information contained in "Nonferrous Metallurgy" (FIAT Review of German Science), Vol. I, p. 141T, M. Hansen, editor. (Previously abstracted as items 25C-44 and 25 C-45, 1949.) 29 ref.

For additional annotations indexed in other sections, see:
14A-107; 20A-347; 22D-44



25 MISCELLANEOUS

25A—General

25A-114. The Charles M. Schwab Memorial Lecture. Karl T. Compton. *American Iron and Steel Institute*, 1949 Yearbook, 18 pages. (Preprint.)

Metallurgical and international problems of significant interest to the military, which include discussions of heat resistant materials, work collaboration, surface tension, titanium, aerial warfare, and the North Atlantic Treaty.

25A-115. Government's Defense Stockpiling Program and Its Effects on Markets and Prices. E. H. Hawkins. *Metals*, v. 20, July 1949, p. 6-7, 9-10.

Organization, policies, and methods involved. Military procurement program. Stockpiling materials range from Sb to zircon, from castor oil to diamonds.

25A-116. Punch Card for the Field of Metal Finishing. T. A. Hood. *Metal Progress*, v. 56, July 1949, p. 75-78.

Designed at the Defense Research Laboratories of the Commonwealth of Australia's Department of Supply and Development, it is the first of a coordinated series of cards planned to cover each of several divisions of metallurgy.

25A-117. G.E.C. Research Laboratories Conversazione. *Engineer*, v. 188, July 1, 1949, p. 12-13.

Some of the facilities and activities of the laboratories of General Electric, Ltd., Wembley, England. These include production of sapphire rod, synchrotron vacuum chambers, photometry, diamond dies for wire drawing, and use of powder metallurgy in production of "G.E.C. Heavy Alloy" (about 90% W, plus N and Cu). Mechanical and physical properties of this alloy are given.

25A-118. The Measurement of Bearing Wear by Radioactive Methods. *Engineering*, v. 168, July 1, 1949, p. 9.

New British application of radioactivity in engineering research.

25A-119. Recent Advances in Hard Metal Processes. *Chemical Age*, v. 61, July 2, 1949, p. 24.

On basis of English patent applications.

25A-120. High-Voltage Research and Development in the British Cable-Making Industry. *Engineer*, v. 188, July 8, 1949, p. 51-52. Condensed from paper by T. R. Scott.

Miscellaneous metallurgical and nonmetallurgical research.

25B—Ferrous

25B-33. Steel's Problems and Prospects. Walter S. Tower. "Yearbook of the American Iron and Steel Institute, 1948", p. 67-76.

See abstract of "Position of Steel in 1948", *Mining and Metallurgy*, item 25B-62.

25B-34. Production Swells at Fontana. *Western Machinery and Steel World*, v. 40, July 1949, p. 90-91.

New steel-production facilities.

25B-35. What's Left of Japan's Iron and Steel Industry? Joseph Z. Reday. *Steel*, v. 125, Aug. 8, 1949, p. 68-72, 94, 96.

Appraises the current status and future competitive position of the industry in terms of physical and economic realities.

25B-36. (Book) **Yearbook of the American Iron and Steel Institute.** 689 pages. 1948. The Institute, 350 Fifth Ave., New York 1, N. Y.

Proceedings of the 56th general meeting held in New York, May 26-27, 1948. Most of the individual papers have been previously abstracted.

25B-37. (Book) **How Steel Is Made.** 63 pages. 1948. Inland Steel Co., 38 So. Dearborn St., Chicago 3, Ill.

Story of steel from the ore to the product in nontechnical language.

25B-38. (Book) **Alloy Steels.** J. Winning. 72 pages. 1948. Emmot & Co., Ltd., 31 King St., West, Manchester, England. 2s., 6d.

Metals are classified according to type so that non-standard alloys may be fitted into their appropriate class. Structural steels and physical properties. Carburizing steels including typical applications of structural steels and also deals with case-hardening and nitriding. High-speed carbon and low-alloy tool-steels. Some notes on sintered alloys. Stainless and heat resisting steels are described under their ferritic and austenitic types respectively. Notes on the selection of alloys for specific purposes. Machinability of steels and a static method of measuring the susceptibility of steel to cold working.

25B-39. (Book) **Steel Making in America.** Douglas A. Fisher. 101 pages. 1949. U. S. Steel Corp., 71 Broadway, New York 6, N. Y.

A nontechnical treatment of the history, manufacture, and uses of steel.

25C—Nonferrous

25C-47. Titanium—The Metal With a Future. *Engineering and Mining Journal*, v. 150, July 1949, p. 119-123.

Future prospects for commercial utilization of titanium. Appraisal of titanium's properties and potential uses, by H. C. Cross; and a survey of ore reserves.

25C-48. Recent Production and Productivity of United States Non-Ferrous Metal Mines. Jesse L. Maury. *Mining World*, v. 11, July 1949, p. 15-17.

CHAPTER MEETING CALENDAR

CHAPTER	DATE	PLACE	SPEAKER	SUBJECT
Akron	Oct. 12	University Club	T. Donovan	Silver Dollar Quiz
Baltimore	Sept. 19	Engineers' Club	Tom Donovan	Heat Treatment
Birmingham	Oct. 4	Hooper's Cafe	F. G. Tatnall	Physical Testing of Metals
Boston	Oct. 7	Hotel Sheraton	Norman I. Stotz	Selection and Treatment of Tools
Calumet	Oct. 11	Phil Smidts, Hammond, Ind.	Mr. Bitner	Springs
Chattanooga	Oct. 14	Maypole Restaurant	J. A. Koch	Toolsteel
Chicago	Sept. 19	Furniture Mart Club Rooms	C. A. Zapffe	A New Theory for the Solid State
Chicago	Oct. 10	Furniture Mart Club Rooms	B. R. Queneau	Metallurgical Control in the Steel Industry
Cincinnati	Oct. 13	Engineering Society	N. K. Koebel	Heat Treating in Continuous Atmospheres
Cleveland	Oct. 3	Cleveland Club	L. B. Rosseau	Salt Bath Furnaces and Their Application to the Metallurgical Industry
Columbus	Sept. 20	Fort Hayes Hotel	A. H. d'Arcambal	Materials for Precision Cutting Tools
Columbus	Oct. 11	Fort Hayes Hotel	S. Depoy	Salt Baths and Their Limitations
Dayton	Oct. 12	Engineers' Club	J. T. Wilson	Metallurgical Aspects of High Voltage X-ray
Des Moines	Oct. 11	Younkers Tearoom	Glenn Brockett	Materials of Construction in Diaphragm Motor Valves
Detroit	Oct. 10	Rackham Memorial	A. L. Boegehold	William Park Woodside Lecture
Ft. Wayne	Oct. 10	Chamber of Commerce	O. E. Cullen	Furnace Atmospheres
Georgia	Oct. 3	Town House	Gerald A. Rosselot	Application of Research to Production Problems
Golden Gate	Oct. 10	Union League Club San Francisco	F. J. Robbins	Heat Treatments for Machinability
Inland Empire	Sept. 30	Spokane Hotel	F. J. Robbins	Production of Boron Steel
Kansas City	Sept. 21	Fred Harvey's Pine Room	E. E. Thum	Important Changes in Metallurgy Since 1940
Kansas City	Oct. 19	Fred Harvey's Pine Room	R. G. DeHuff, Jr.	Materials for Gas Turbines and Jet Engines
Los Alamos	Oct. 11	High School Auditorium	G. H. Tenney	Trends in Industrial Radiography
Los Angeles	Sept. 22	Rodger Young Auditorium	Joseph A. Burgard	The Application of Metallurgical Principles to Design of Products
Los Angeles	Oct. 27	Rodger Young Auditorium	John E. Dorn	Metallurgical Principles Applied to the Forming of Products
Milwaukee	Sept. 20	City Club	J. Wilson	Industrial Significance of Atomic Energy
Milwaukee	Oct. 11	City Club	Arthur F. Underwood	Bearing Metals and Lubrication
Montreal	Oct. 3	Queen's Hotel	A. Morrison	Isotopes
New Haven	Oct. 13	Long Hill Inn, Wallingford	Birger Egeberg	Metallurgical Problems in the Production of Silverware
New Jersey	Oct. 19	Essex House, Newark	H. K. Work	Cold Working Properties of Steel
New York	Sept. 30	Engineers' Club		Annual Banquet and Smoker
North Texas	Oct. 5	Ft. Worth	J. Y. Riedel	Toolsteels
North West	Oct. 12	Covered Wagon, Minneapolis	William Berkey	Induction Hardening
Northwest Pa.	Sept. 22	G. E. Clubhouse, Erie	Dr. Crosby	Titanium
Northwest Pa.	Oct. 27	Elks Rainbow Room Titusville, Pa.	S. V. Williams	Heavy Arc Welding
Ottawa Valley	Oct. 4	Bureau of Mines	G. H. Guest	Use of Radioactive Isotopes in Metallurgy
Philadelphia	Oct. 28	Engineers Club		Atomic Energy
Pittsburgh	Oct. 13	Roosevelt Hotel	Sir Charles Goodeve	Cooperative Research in the British Iron and Steel Industry
Puget Sound	Sept. 28	Engineer's Club, Seattle	F. J. Robbins	
Puget Sound	Oct. 19	Engineer's Club, Seattle	J. C. Youlten	Principles of Heat Treatment
Purdue	Oct. 4	Purdue Union	A. E. Focke	Radio Isotopes in Metallurgy
Purdue	Oct. 25	Purdue Union	Harry Natchans	Dirilyte Tableware
Rockford	Oct. 3	Faust Hotel	E. E. Thum	Implications of Atomic Energy
Rocky Mountain	Sept. 27	Oxford Hotel, Denver	E. E. Thum	Implications of Atomic Energy
Rocky Mountain	Oct. 26	Oxford Hotel, Denver	F. J. Robbins	The Production and Use of Boron Steel
Pueblo Group	Sept. 28		E. E. Thum	Implications of Atomic Energy
Pueblo Group	Oct. 25		F. J. Robbins	The Production and Use of Boron Steel
Saginaw Valley	Oct. 11	Fischers Hotel, Frankenmuth, Mich.	Bruce Gonser	Titanium
St. Louis	Sept. 19	Melbourne Hotel	E. E. Thum	Implications of Atomic Energy
St. Louis	Oct. 21	Forest Park Hotel		Panel Discussion
Springfield	Sept. 19	Hotel Sheraton	J. W. Gulliksen	Pressworking of Metals
Springfield	Oct. 17	Springfield, Vt.		
Syracuse	Oct. 4		F. J. Foley	Modern Forging Practice and Technique
Terre Haute	Oct. 3	Indiana State		Petroleum Production
Texas	Oct. 4	Ben Milam Hotel	J. Y. Riedel	Toolsteels
Tri-City	Oct. 11		Charles A. Turner	Rapid Heating by Gradiation
Utah	Oct. 20	Salt Lake City	C. K. Donoho	Nodular Cast Iron

Warren	**Oct. 13**	El Rio Cafe	**J. E. Carter**	Toolsteels and Their Applications
West Michigan	**Sept. 19**		**R. L. Kenyon**	Finishing Steels for Decorative and Protective Purposes
West Michigan	**Oct. 17**			
Wichita	**Sept. 22**	Knights of Columbus Hall	**E. E. Thum**	Implications of Atomic Energy
Worcester	**Oct. 12**	Heywood Wakefield Co. Gardner, Mass.	**Wm. B. Stearns**	Wood and Metals in the Furniture Industry
York	**Oct. 12**	Waynesboro, Pa.		

EMPLOYMENT SERVICE BUREAU

The Employment Service Bureau is operated as a service to members of the American Society for Metals and no charge is made for advertising insertions. The "Positions Wanted" column, however, is restricted to members in good standing of the A.S.M. Ads are limited to 50 words and only one insertion of any one ad. Address answers care of A.S.M., 7301 Euclid Ave., Cleveland 3, O., unless otherwise stated.

POSITIONS OPEN

East

DEVELOPMENT ENGINEERS: Two, wanted for the New York-Philadelphia territories by manufacturer of stainless and alloy wire, rod and strip. Opportunities for advancement are limited only by capabilities of successful applicants. Both recent graduates and those with metallurgical, chemical or mechanical engineering experience will be considered. Box 9-5.

Midwest

GRADUATE METALLURGIST: Preferably with M.S. degree, for full time work on a project on the mechanical properties of single crystals of pure iron. Opportunity for advanced study in night school. Give full qualifications and salary required in letter. Metals Research Laboratory, Carnegie Institute of Technology, Pittsburgh 13, Pa.

ROLL DESIGNER: With practical experience in toolsteel and specialty rolling. Must be capable of handling administrative duties of rolling mills. Box 9-130.

West Coast

DISTRICT SALES MANAGER: Pacific northwest. Knowledge of electric welding. Willing to travel extensively in own car. Working with and educating distributors selling nationally known steel products for maintenance and repair of construction, mining, quarry equipment. Salary and commissions. Write qualifications. Box 9-10.

POSITIONS WANTED

METALLURGIST: M.S., age 29, married. Desires teaching, research or development position. Some experience in physical metallurgy research and teaching. Ten years' experience in toolmaking. Theses in physical metallurgy and powder metallurgy. Available immediately. Box 9-15.

JUNE 1949 GRADUATE: Age 25, single; no dependents. B. of Met. Eng. from Rensselaer Polytechnic Institute. Interested in production and production control. Willing to locate anywhere in U. S. or Canada. Box 9-20.

METALLURGIST: M.S. and B.S. degrees from Columbia University, 1949. Interested in development or production work in either ferrous or nonferrous field. Research experience in steel heat treating. Held responsible managerial position in Navy during War. Has thorough training in statistical quality control. Age 29, married. Box 9-25.

METALLURGIST: M.E., M.S. in metallurgy. Age 30, married, two children. Two and one-half years' experience teaching chemistry and metallurgy. One year as chief metallurgist of small industrial concern. Nonferrous and ferrous alloys; fabrication, selection of material, heat treating, mechanical and metallurgical testing. Box 9-30.

METALLURGIST: Veteran, age 31, married, one child. B.A., B.S. in metallurgical engineering from midwestern university. Four years' laboratory experience—automotive and stainless steel, mainly metallography. Desires position in production or sales. Location—Ohio, Michigan, Indiana, Illinois. Box 9-35.

PLANT ENGINEER: Experienced in production, development and assembly of can-making and lamp machinery. Two years' drafting and 16 years' machine shop training. Age 38, married, family. Two years College. Can give and take orders. Twelve years a supervisor. Box 9-40.

SALES ENGINEER: Age 30, graduate engineer. Now contacting New York State industrial plants. Desires additional industrial lines. Excellent references. Box 9-45.

METALLURGIST: B.S. from Massachusetts Institute of Technology. Diversified experience in physical metallurgy, metallography, heat treating and physical testing. Specialized in high-temperature alloys, high-carbon and high speed toolsteels. Failure investigation, control of grain size, forging, material selection, process and material specification. Will consider any offer. Willing to learn and advance. Desires production or laboratory position. Box 9-50.

METALURGICAL ENGINEER: B.S. Some industrial engineering studies. Age 27, married. Five years' diversified ferrous and nonferrous experience including technical control, process development and production trouble-shooting in metal fabricating plants. Two years' administrative duties in Navy. Currently employed but desires position with increased responsibility or sales training. Box 9-55.

METALLURGICAL ENGINEER: Recent graduate with B.S. degree in metallurgical engineering. Veteran, age 24, single, desires position as trainee in any phase of metallurgy. Anxious to start at bottom to learn process thoroughly and contribute to its success. Report writing a pleasure. Location open. Box 9-60.

METALLURGICAL ENGINEER: Five years of college work with a B.S. degree in metallurgy. Fourteen years of diversified practical plant experience in the heat treatment of tools, dies, production items, and nonferrous metals. Management and production experience. Progressive, efficient. Location unimportant. Box 9-65.

ADMINISTRATIVE ASSISTANT: B.S.Ch.E. from Purdue. Age 35, married. Exceptionally broad background including supervision and technical service in nonferrous smelting and refining, electrometallurgy, metals analysis, explosives, and precision manufacturing. Four years of Naval administration at high level. Desires liaison position or assistant to top management. Prefers medium or small company. Box 9-70.

METALLURGICAL ENGINEER—CERAMIC ENGINEER: Single, age 23. B.S. in metallurgical engineering and B.S. in ceramic engineering from Virginia Polytechnic Institute. Desires position as refractory engineer or process engineer. Free to travel. Location no problem. Box 9-75.

ARMY COMMISSIONS

The United States Army is seeking to interest outstanding individuals from the scientific and professional fields in applying for commissions as officers in the Regular Army. The general qualifications are a Bachelor of Science degree with three years of practical experience, or a Master's or Doctor's degree in engineering or appropriate science.

Openings in the field of metallurgy for such commissions are at present available in the Ordnance Department and the Corps of Engineers. Those interested in the advantages offered by a career as an officer in one of the technical branches of the U. S. Army should secure further information or application blanks from:

HEADQUARTERS FIFTH ARMY
1660 E. HYDE PARK BLVD.
CHICAGO 15, ILL.
ATTENTION: ALFSI-RW

METALLURGICAL ENGINEER: B.S., University of Pittsburgh. Presently employed but dissatisfied due to lack of progress. Ambitious and desires employment with progressive firm. Interested in development and research, sales, and production. Desires position in vicinity of Pittsburgh or area immediately northwest of Pittsburgh. Age 25, married. Box 9-80.

METALLURGICAL ENGINEER: M.S. in metallurgical engineering. Age 28. One year's experience in forge plant production laboratory. Publications. Presently employed, but desires position in production, development, or sales engineering with manufacturer or foundry. Box 9-85.

METALLURGIST: Recent graduate, honor student, B.S. in metallurgical engineering. Age 25, single. Interested in sales, production or foundry operations. Prefers a training program. Location unimportant. Box 9-90.

SALES MANAGER AND CHIEF METALLURGIST: Established nation-wide following on powdered metal field, available to television and radio, bearings, machine and electrical parts fabricator on either consultation, partnership, factory representative or employee basis. Address: E. R. Walter, 5351 W. Iowa St., Chicago 51, Ill.

YOUNG GRADUATE METALLURGIST: Age 24, married. Desires position in a production capacity with opportunity to train for future responsible position. Four years' industrial experience. Analytical methods, metallography, heat treating, electrochemistry, mechanical testing, fabrication of metals from castings to finished stock and development of metallurgical processes. Prefers to locate in West. Box 9-95.

SALES SUPERVISOR: Desires increased responsibilities selling, training fieldmen, and supervising their activities. Presently active in Pennsylvania. Experienced seller, buyer and metallurgist in Central and Middle Atlantic States area. Owns home but will move. Has 1949 car. Box 9-100.

METALLURGIST: Age 45; 17 years experience in forging, steel treating and solving production problems. Qualified as technical assistant to executive. Good record in quality control and cutting costs. Box 9-105.

OPENHEARTH METALLURGIST: Or research engineer. B.S. and M.S. in Met. Eng.; age 33, married, two children. Eleven years experience in teaching, production, research and development work on basic and acid openhearths. Served as supervisor in charge of openhearths, as senior research engineer on acid openhearth, and as basic openhearth pit foreman; two years teaching metallurgy. Box 9-110.

MANUFACTURER'S REPRESENTATIVE: Covering tri-state area with headquarters in Cincinnati. Can handle one additional line of metal processing equipment on a commission basis. Operated by an engineering graduate with sales, metallurgical and testing experience. Box 9-115.

METALLURGICAL ENGINEER: College graduate, age 33, married, one child. Experience 8½ years, mainly aircraft, including metallography, radiography, heat treating, physical testing, investigation of machining and service problems, specification writing, research and development. Two years production supervision of finishing. Desires position in development, research or production. Midwest preferred. Box 9-120.

METALLURGIST: B.S. in Met. Eng. Age 30, married. Seven years' experience—2 years nonferrous, 5 years ferrous. Experienced in production, and tool and die steels, analytical chemistry, investigation of service failures, forging, plating, physical testing of finished products, commercial steel treating. Desires responsible position with opportunity for advancement. Box 9-125.

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MANUFACTURERS' LITERATURE

333. Castings, Beryllium Copper

Bulletin 11 entitled "Beryllium Copper Investment Casting" gives full data for the first time on economical use of precision-cast beryllium copper for industrial parts. Beryllium Corp.

334. Combination Burners

New 8-page catalog 409 of special interest to industrial plants burning oil or oil and gas in heat processing applications. Hauck Manufacturing Co.

335. Core Baking

Two new data sheets outline the fundamentals of electronic core-baking and describe how the new resin binder is used to great advantage. New data sheets will follow each month. Induction Heating Corp.

336. Descaling Without Pickling

Bulletin describes methods of eliminating pickling acids both for cleaning and for plating plants, thus avoiding stream polution. A. F. Holden Co.

337. Electrodes, Container

Announcing a new Arcaloy AC-DC stainless electrode and new all-steel, moisture-proof and grease-proof container. Packed in containers made to simplify stock problems, these new electrodes produce the cleanest welds in the industry. Alloy Rods Co.

338. Forging Rods

"Titan Forging Rods and Shapes" is the title of a new folder giving the chemical compositions of ten brass and bronze alloys used. Typical brass forgings are illustrated. Titan Metal Mfg. Co.

339. Gas Burners

Bulletin 58 describes, with burner charts and drawings, certified combustion made possible with new series of gas burners. North American Mfg. Co.

340. Hardening, Flame

Latest copy of Tempil Topics gives a concise summary of the flame hardening process. Tempil Corp.

341. Heat Treating

Five booklets now available describe fully with interesting illustrations the different heat-bath processes including carburizing, tempering, and a superior black finish. Heatbath Corp.

342. Irons, Silicon

New data collected over ten to fifteen years on two corrosion resistant high silicon alloys, Duriron and Durichlor, now available in bulletin 113. Duriron Co., Inc.

343. Laboratory Equipment

Literature available on four new developments in laboratory equipment, including new Lectrotherm combustion boats. Laboratory Equipment Corp.

344. Melting Pots

New multi-colored illustrated brochure depicting five different types of Meehanite melting, holding and tilting pots developed especially for use in aluminum foundries, die casting and smelting works. Meech Foundry, Inc.

345. Press, Hydraulic

Straightening, forming, broaching and assembling operations all competently and economically handled by the new hydraulic metalworking press just developed. Niagara Machine & Tool Wks.

346. Surface Control

New 8-page bulletin gives numerous practical advantages of shop control for surface roughness and waviness. Write for "More Profits to You Through Surface Control". Physicists Research Co.

347. Technical Course

Complete training course for technical service representatives attractively presented in special 40th anniversary issue of house organ. Series of photographs follows trainees through the most interesting phases of the course from laboratory to field work lectures. Oakite Products, Inc.

348. Thermometers

New 8-page information bulletin 2451-C, well-illustrated, shows how to obtain accurate temperature readings between minus 100° F. and plus 400° F. with the new Alnor distant reading electric thermometers on points up to 1000 ft. Illinois Testing Labs.

349. Tube Furnace

New electric tube furnace especially designed for general research work. Materials can be tested to maximum temperature and cooled quickly. Bulletin gives full description and also typical heating and cooling curves. Harper Electric Furnace Corp.

350. Tubing

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Metals Review September, 1949

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PLEASE CHECK BELOW, THE OPERATIONS CARRIED ON IN YOUR PLANT:

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